GBFM Version 5.0

User Guide

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1. USER GUIDE

1.1 Host Machine

GBFM5 needs to be installed on a Windows-based PC, running Windows 2000 or Windows XP. It uses the .NET 2.0 framework, so this needs to be installed too. It is freely available from Microsoft, and can be installed using 'Windows Update'. To check that it is installed, look at *Control Panel>Add or Remove Programs*. There should be an entry: *Microsoft .Net Framework 2.0*.

You will also need:

Memory: 1Gb RAM

Processor: fast processor e.g. Intel Pentium 4 3.8GHz or AMDAthlon 3800 or higher. Slower processors will still work, but the processor speed is the main bottleneck when the system runs. Multitasking capability using a dual core does not affect performance so much, and the ability to run in 64bit mode is also not important at the moment. GBFM5 has been tested on a Dell Precision PWS 380 with an Intel P4 3.80 GHz, and a Fujitsu-Siemens Amilo laptop with an AMD Athlon 64 3700+ processor, and these have very similar run times. PC systems with the mid-range AMD 4400, 4600 and 4800 processors might be most suitable.

Storage: The new system can produce a large quantity of data, but with a fairly typical 200gb hard drive, this will not be a problem. Nevertheless, the ability to save model run results onto writeable DVDs would be useful. A model run files when zipped, fit onto a CD or unzipped onto a DVD.

Additional Software: The system also needs to have MSExcel (any version), and it is useful to have Access (or equivalent), (See MS Office), a GIS package (e.g. Manifold) and a decent text editor (e.g.Ultraedit).

1.2 Installation

The system simply needs to be copied onto the host machine. Version 5 has a fixed base year (2004), so it should be installed in a folder called 'gbfm_5_2004'. Future updates can then be added without overwriting this one. Once installed, there will be the GBFM executable file *GBFM5.exe* and a subdirectory *GBFMData*, containing the data for the implementation. Normally the system will be installed on the machine's 'C' drive, but the system can be set up on any drive.

By double clicking *GBFM5.exe*, it is possible to verify that the installation has worked.

1.3 Familiarisation

On loading GBFM 5.0 you should see something like Figure U1 (below).

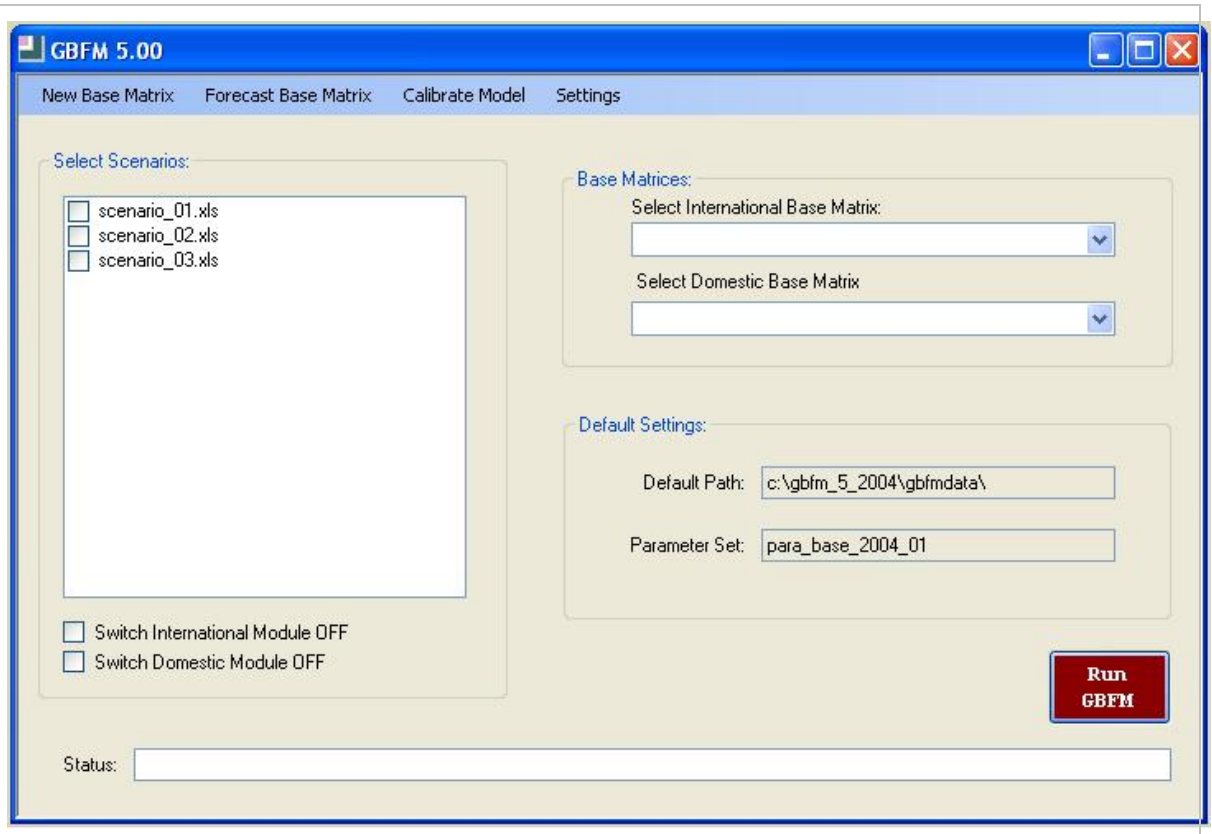


Fig. U1: GBFM Interface.

The main area of the interface allows the user to see which scenarios are available, and which base matrices. To start a model run, the user must specify *one* international base matrix, *one* domestic (pdms) matrix, and *at least one* scenario.

Scenarios are selected by clicking the boxes next to each entry. The base matrices are selected by clicking the drop-down lists as indicated in the diagram. The path and parameter settings can be changed via the 'Settings' item on the menu strip.

The user can use the check boxes at the bottom left of the screen to switch off either the international or domestic modules. This can be used to save time, if, for example, only international flows are to be modelled.
The red button launches GBFM. As the procedure executes it will update the status bar to tell you which scenario is running. If you activate the button, you will notice that the software also launches a *console* window. In many cases this can be ignored, but it provides more feedback, indicating what the software is currently doing. If there are errors during the model run, the details of the problem can be found here. **Do not close the console window**

during a model run, as this will also terminate the main window, and stop the model run.

There is a menu strip with four items: "New Base Matrix", "Forecast Base Matrix", "Calibrate Model" and "Settings". These link through to further dialogs. The first involves creating the base matrices, without which the rest of the system cannot operate, so this will be described next.

1.4 Creating Base Matrices

In GBFM5, the user is responsible for creating base matrices containing origin-destination freight flows that the main model will attempt to assign to multi-modal paths. A procedure has been added to the basic modelling package to enable new matrices to be constructed.

Start by launching GBFM. On the menu bar there is an item labelled 'new base matrix'. Click this menu item and a new dialog box will pop up: see Figure U2 (below)

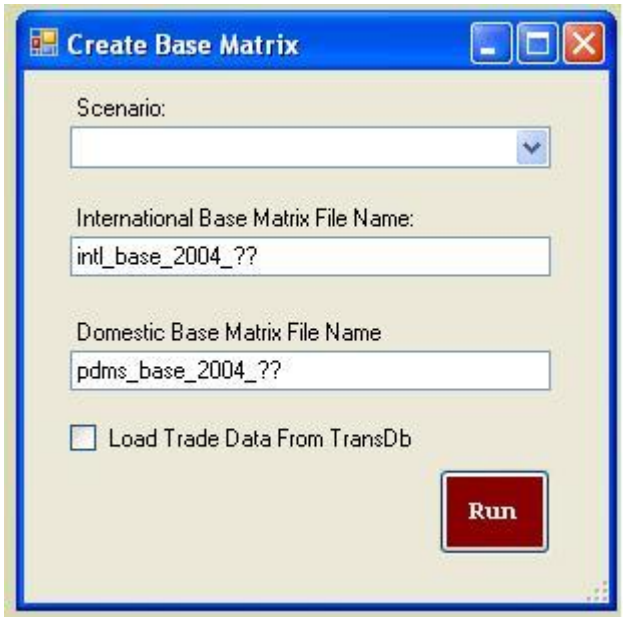


Fig. U2: GBFM Base Matrix Interface.

The concept for constructing the base matrices is quite straightforward. The software needs to be able to find a *scenario* file containing transport costs, and it needs to be given file names under which the new matrices can be stored.

The scenario is selected from the top-most drop down box. Any scenario will work, but it makes sense to use one with current values.

In the text boxes labelled 'International Base Matrix File Name' and 'Domestic Base Matrix File Name', part of the file names have already been entered, but the question marks need to be replaced by a recognisable suffix. For example if your scenario is called *scenario_01* then the base matrices might also be called *intl_base_2004_01* and *pdms_base_2004_01*. The names can be more descriptive if required, but they should always start, as shown.

Users should leave “Load Data From TransDb” unticked.

The procedure is launched by pressing the 'Run' button, and progress can be followed inside the console window. When complete, the status bar will show a message e.g. 'Base Matrix Completed at: *time*'. You should verify that new files have been created inside *c:\gbfm_5_2004\gbfmdata\inputs*.

1.5 Running GBFM

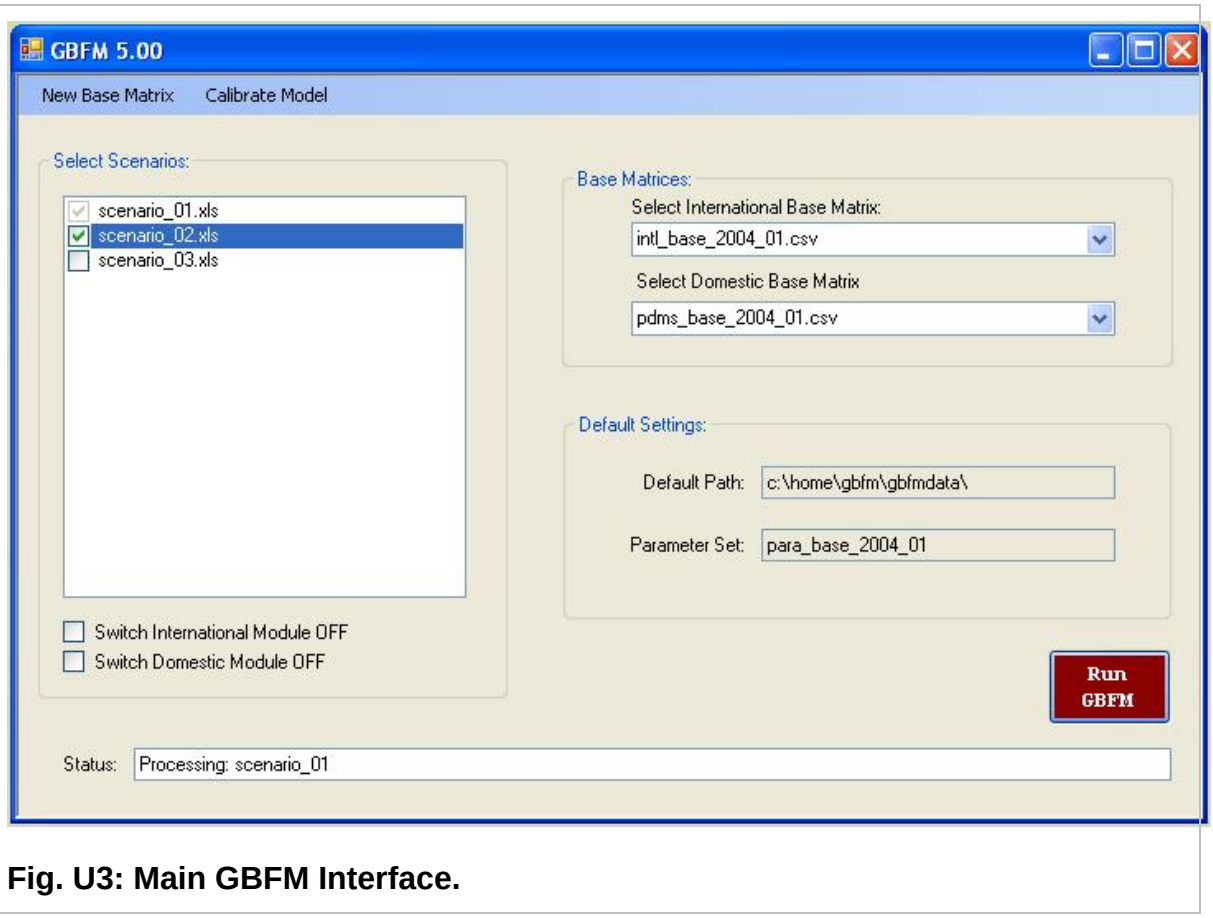


Fig. U3: Main GBFM Interface.

Once the base matrices are created, the main GBFM model can run. This is achieved by using the controls on the main interface (Fig U3). The user selects one or more scenarios, an international base matrix and a domestic matrix and then clicks the 'run GBFM' button. Progress can be followed in the console window (Fig U4), and the outputs will be stored in

the '/outputs' folder under the same name as the scenario. Therefore if two or more scenarios are run in a single batch they will not over-write each other. However, if the same scenario is run twice in two separate batches it will overwrite previous results.

Two tick boxes are provided, allowing the user to switch off either the international or the domestic module. If, for example, the domestic module is deactivated, GBFM will simply produce the 'Intl' output files. This is simply a way of reducing the processing time if only one set of outputs is required.

The default path for locating the input and output files is shown on the screen. This can be changed via the 'Settings' item on the menu strip.
The name of the file containing the parameter set is also shown on screen, and can also be changed via 'Settings'. The main model parameters, including the value of time, the settings for the mode specific constants, the consignment size formula and the macro-economic forecasting model can be set here.

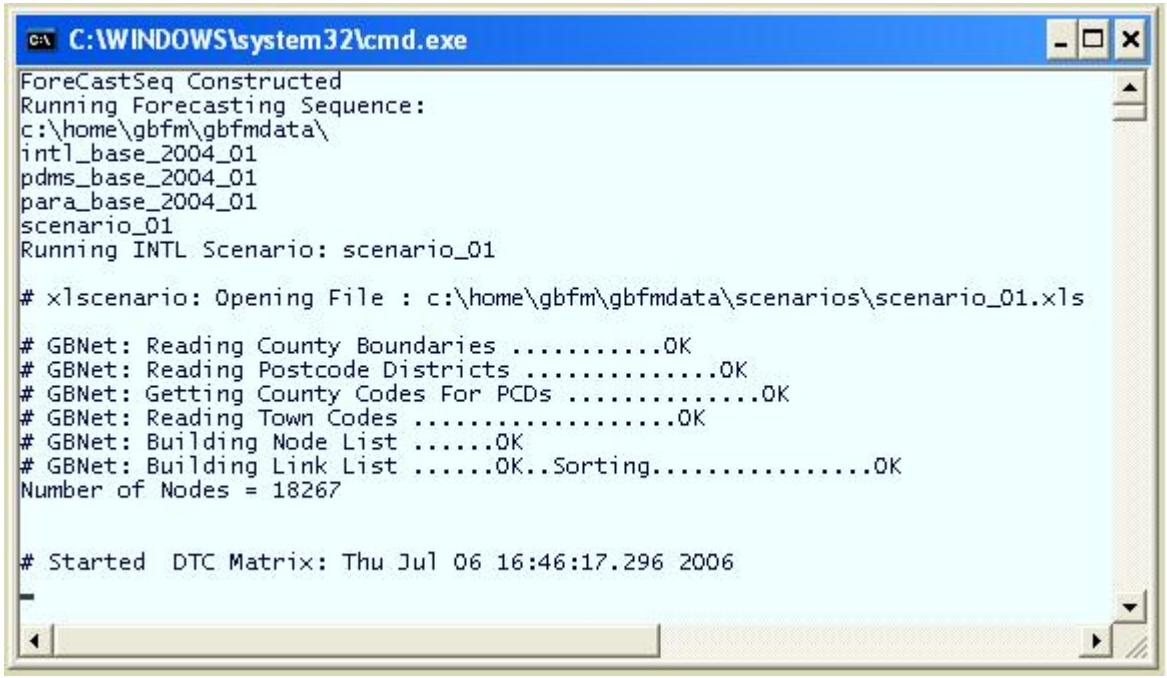

C:\WINDOWS\system32\cmd.exe
ForeCastSeq Constructed
Running Forecasting Sequence:
c:\home\gbfm\gbfmdata\
intl_base_2004_01
pdms_base_2004_01
para_base_2004_01
scenario_01
Running INTL Scenario: scenario_01
xlscenario: Opening File : c:\home\gbfm\gbfmdata\scenarios\scenario_01.xls
GBNet: Reading County Boundaries ....OK
GBNet: Reading Postcode Districts ....OK
GBNet: Getting County Codes For PCDs ....OK
GBNet: Reading Town Codes ....OK
GBNet: Building Node List ......OK
GBNet: Building Link List ......OK..Sorting.................OK
Number of Nodes = 18267
Started DTC Matrix: Thu Jul 06 16:46:17.296 2006

Fig. U4: GBFM Console Interface.

The console window appears when the program is launched. It provides the user with information about the current status of the program, and details of any runtime errors. If any problems are encountered, or suspected, the console window is the first place to check. The most likely runtime errors are to do with file handling, for example if another process has opened a file that GBFM needs access to. If this happens, the file name will be shown in the console window with an error message. The console window should not be closed by the

user, when the system is processing, as this will abort the model run. The best way to halt the program is to click the [X] icon in the top right hand corner of the main GBFM interface.

1.6 Calibration

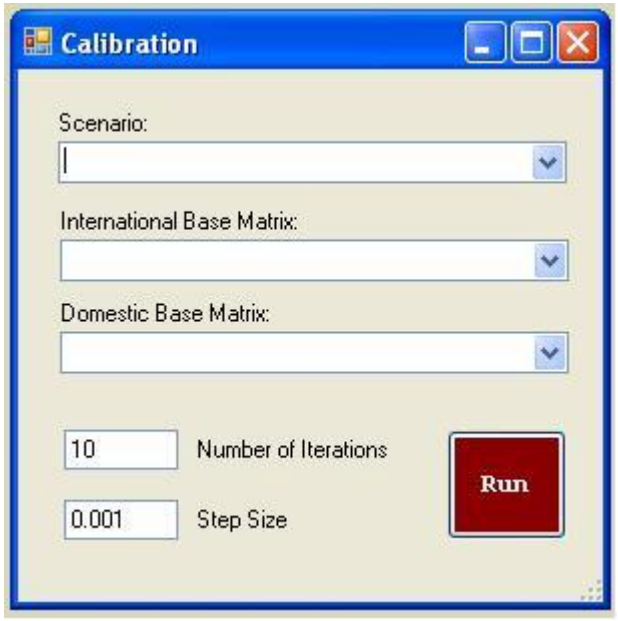


Fig. U5: GBFM Calibration Interface.

The calibration menu allows the user to set up a series of model runs in the normal way by selecting a (single) scenario and base matrices. The model will run as many times as specified in the 'Number of Iterations' box, and at the end of each model run the software will compare the estimated flows with actual data, and adjust the calibration weights according to the 'Step Size' setting. A lower number e.g. 0.000001 will make a finer adjustment than a higher one e.g. 0.001. Values higher than 0.01 are not recommended, and the step size should always be a positive number.

Since the model is repeating the same scenario, each iteration of the calibration will overwrite the previous results. However, the console window displays a summary of the goodness-of-fit at each stage for each of the calibration areas: international bulks by link, international unitised traffic by link, domestic road traffic by vehicle type and domestic rail traffic by link.

1.7 Forecasting the Trip Matrix

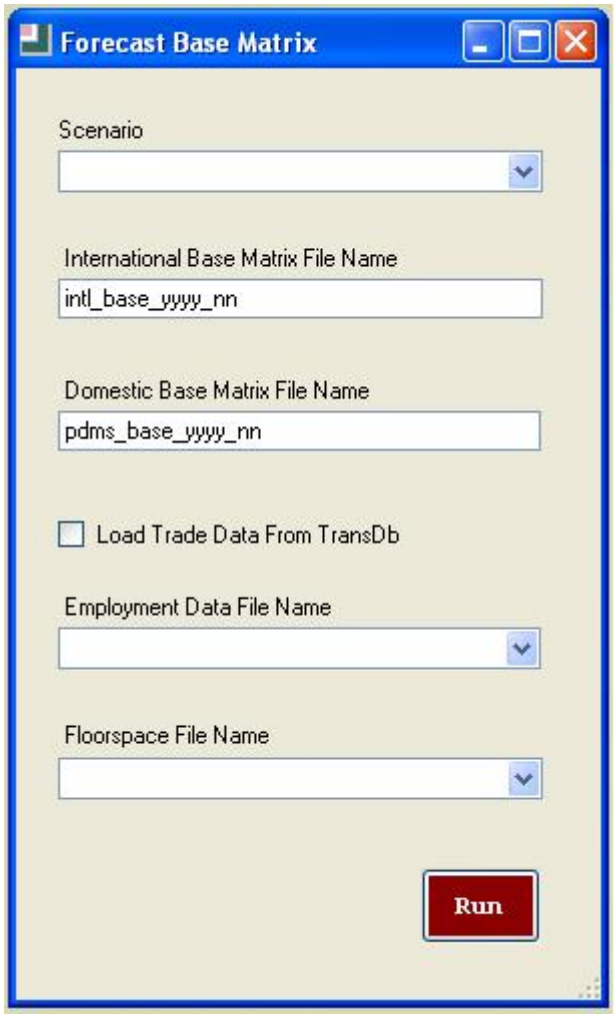


Fig. U6: GBFM Matrix Forecast Interface.

A forecast trip matrix can only be constructed if the user has already created a base year matrix. This is because the factors required to match the flows to the CSRGT are calculated with the base year matrix, and re-used for the forecast matrix. You can verify that '/basemat/map_doms_00.csv' exists.

By clicking 'Forecast Base Matrix', the relevant dialog appears (Fig U6). The first steps are similar to building a base matrix; a scenario is chosen from the available list, and two new filenames are entered. A forecast base matrix may be for a specific future year, in which case it would make sense to label it with the year it is meant to represent. Otherwise, as long as the file prefixes 'intl_base' and 'pdms_base' are not changed, the suffix can be anything. The 'Load Trade Data from TransDb' option should be left un-checked.

The matrices are forecast by providing the system with forecasts of employment and floorspace. The inputs need to be prepared externally and saved in the '/basemat/' folder. The best way of doing this is by modifying the standard input files:

'/basemat/pcd_sic_01_all_nm.csv', containing employment data by SIC and '/basemat/pcd_m2_type_001.csv' containing floorspace data by type (warehousing, industry, retail). If they are saved according to the same naming convention (pcd_sic*.csv and pcd_m2*.csv) they will be listed in the drop down boxes.

Then click the red button, and at the end of the run, the results will be placed inside /inputs, where they can be accessed by the multi-modal model.

1.8 Changing the Configuration Settings

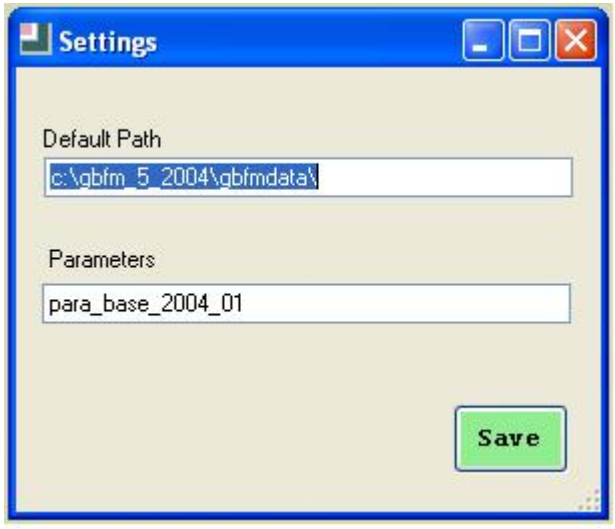


Fig. U7: GBFM Settings Interface.

The final menu item contains two settings to be changed and stored. The first is the default path, directing the program toward the right input files, and giving it a path for the model outputs. This should be decided at installation time. Note that the default path is c:/gbfm_5_2004/gbfmdata. If you have installed the system on a different drive letter, this needs to be changed before any of the model functions will run. Once the new setting is entered click the green 'Save' button.

The second setting is the name of the parameters file. It allows the user to store sets of parameters with (for example) different values of time or other external (i.e. not calculated by GBFM) variables. In general, these should be preset before any calibration is carried out, or any data is produced. However, they can also be used to test the model sensitivity to these variables.

1.9 GBFM Scenario Settings

GBFM uses scenarios to represent combinations of policy variables. An individual model run is defined by the scenario selected.

A base year scenario has been supplied with the software in the '/scenarios' folder. Any new scenario should be created by modifying this file. Unlike earlier versions (up to and including Version 4.x), any scenario file can be accessed by GBFM (previously, there was one 'live' file, so the user had to rename their scenarios to activate them). For this reason, it is a good idea to only keep valid scenario files in this folder.

The scenarios need to be opened using MS Excel. Note that the spreadsheet content is also different from previous versions, although some of the entries are similar, so scenarios designed for previous versions should not be copied in.

The scenario has three pages:

- Scenario: the main inputs for the model.
- GBFM: a summary of the variables that GBFM will read, using values computed inside the Scenario page.
- VSTOCK: a summary of the haulage costs for individual lorry categories, also calculated from the Scenario page.

Only the Scenario page should be edited. The other two pages are simply interfaces for the GBFM software to read, and a convenient way to see what is being read into the system. The Scenario page is set out in five blocks: Year, Inputs, Road, IM Rail, and Bulk Rail. In each block there are Items, Units, Comments, and Values. The model results can only be changed by changing the entries in the Values column, but it may be helpful to edit the other columns, for example to add comments explaining which settings were edited and the reasoning behind it.

Each section is covered below:

1.10 The Year

GBFM has a built-in trend forecasting technique that can be controlled by setting a year value. It uses a linear relationship with manufacturing output that can be controlled via the parameters file, and forecast against the contents of the 'dom_grow_2004_00' file. Note that this relationship only affects domestic demand. International demand is controlled via trade forecasts, accessed through the 'trd_grow_2004_00' file. Therefore, by changing the year value, GBFM will forecast traffic growth in both domestic and international sectors. For international trade this is the only forecasting method available, but for the domestic sector, the user may wish to use the matrix building routines, using spatially disaggregated

forecasts of employment and land use, in which case the default 'dom_grow_2004_00' input should be replaced with one that shows no change in manufacturing output beyond the base year, 2004. Alternatively, the 'macfcst_par_b' parameter can be set to zero in '/inputs/para_base_2004_01.csv' to disable this permanently.

At this stage it is still unknown how well the more complex matrix forecasting procedure (using employment and land use data) explains macro changes in freight volumes, so in practice, the two forecasting techniques may need to be balanced and combined. See section 6.5 of the main GBFM Version 5.0 report for a discussion on the methods.

1.11 Inputs

Inputs are links to external text files that GBFM will open. The entries must be valid file names, and the files must be constructed according to the base year templates provided.

The inputs are:

- Cross Channel Links: unitised freight services between GB and short sea destinations, i.e. the Continent and Ireland.

- Bulk Links: bulk freight services between GB and short sea destinations.
- GB Rail Network: GB inland rail services. Channel Tunnel rail services are listed in the Cross Channel Links, and **not** duplicated here.

- Trade Forecasts: growth rates for international flows, split by direction, commodity, trading partner, and basic mode. The stock settings are derived from the 'FORK' model.
- Domestic Forecasts: containing the trend for UK manufacturing output up to 2004, and forecasts to 2010.

- Toll Settings: a file allowing the user to set road tolls for specific vehicle, road and area types. There are also Dynamic and Static speed settings. The Dynamic parameter, inherited from Version 4, is currently disabled, and has **no impact here**, but the Static parameter can still be used to adjust freight speeds in the network for specific road types.

1.12 Road

This block is a cost model calculating road haulage costs for five different HGV categories. Originally there were 16 HGV categories but this proved onerous to calibrate. The now unused HGV categories are ‘greyed out’. The cost items are listed vertically, and the lorry types are listed horizontally. Where the lorry type is articulated, the tractor and trailer costs are shown in two adjacent columns. The cost items shown in bold type are the calculated

values that are passed into GBFM, but all the items affect these. In general, the cells containing values can be edited, whereas the cells with formulae should not.
The most frequently edited variables in this block would be: UK Fuel Cost, (Continental) Fuel Cost, Basic Wage, Fuel (Consumption) Rate, and VED.

1.13 Intermodal (IM) Rail and Bulk Rail

Rail costs are split between intermodal and bulk services, to take account of the different operational characteristics. The main components are productivity, traction, wagons, track, and terminals, with a summary at the end. The most frequently edited variables are likely to be those that affect train lengths and speeds, within the productivity section.

1.14 Forecasting Strategies

There are two (theoretically) mutually exclusive means of forecasting tonnes lifted in GBFM5. The first involves using the 'trend forecasting' method controlled by setting the year in the 'Scenario' worksheet. The second involves using the 'forecast trip matrix' routine, and switching off the trend forecast.

In some circumstances, it will not be possible to use the 'forecast trip matrix' approach, either because of time constraints or because it would involve using a separate forecast of land use and employment by sector, which may be unavailable. In this case the 'trend forecast' method should be used.

However, as demonstrated below, the 'forecast trip matrix' approach is potentially much more powerful, and capable of dealing with traffic distribution as well as generation.

Before it is used, it is important to understand what it will do. A simple 'backcast' example for 1996 is set out below. See section 6 of the main GBFM Version 5.0 report for further discussion on forecasting strategies.

Testing GBFM's response to changes in employment levels and floorspace.

1.15 Employment

GBFM responds to changes in employment levels by SIC. It is therefore possible to input future levels and locations of new employment by SIC to model the extra traffic generated.

To test how GBFM responds, a representation of 1996 has been generated to be compared to actual traffic figures in 1996. To do this, 2004 employment levels have been scaled down to 1996 values. This has been done using figures from www.statistics.gov.uk showing the total workforce increase from 1996 to 2004: from 28,091,000 to 30,572,000. All SIC categories in 2004 were therefore scaled down to 91.9% (28,091,000 / 30,572,000).

In the pure domestic part of the model, the traffic *generated* in a zone is proportional to the number of employees. Therefore doubling the employees in the origin zone doubles the traffic originating there.

The amount of traffic *received* in a zone is also proportional to the number of employees. Therefore if both the origin's and the destination's employee count were doubled, the forecast traffic between them would quadruple.

Reducing all employment to 91.9% of 2004 levels should therefore result in traffic reducing to 0.919^2 = 84.4%. However traffics below a certain threshold are lost. Reducing all traffic volumes by 15.6% results in more traffic falling under this threshold and being lost thus exaggerating the overall reduction in traffic.

The following table shows this response by NST1 for pure domestic traffic (Million tonnes)

NST1	2004 base	All Employment scaled to 91.9%	Per cent traffic reduction
0	105	77	26.4%
1	267	212	20.4%
2	30	27	10.5%
3	72	60	15.9%
4	21	17	18.1%
5	39	32	18.7%
6	535	449	16.2%
7	9	7	21.6%
8	52	41	20.7%
9	493	397	19.6%
Grand Total	**1,624**	**1,320**	**18.7%**

Looking back from 2004 to 1996, CSRGT reports traffic as 6.1% lower in 1996 than in 2004 – i.e. a scale factor of 93.9%.

Therefore this GBFM modelled scale factor of 81.3% represents rather too much of an impact. This implies that while employment is an important determinant of freight generated at any time, changes in industrial structure has led to employment (in manufacturing particularly) generating less freight over time. It follows that a scaling factor needs to be incorporated **over time** to reduce the relative impact of employment as a determinant of freight generated. This appears to be intuitively reasonable given recent structural changes in the economy.

International traffics are controlled by trade figures. Although changes in employment can change the distribution of international traffic within a county, the totals are always scaled back up to the known trade figures. This results in no overall response in tonnes to changes in employment levels.

1.16 Floor space

GBFM also responds to changes in floorspace disaggregated by:

- Warehouses
- Factories
- Retail space
- Office space

It is therefore possible to input future levels and locations of planned new floorspace by type to model the extra traffic generated.

Again a representation of 1996 has been approximated by scaling all floorspaces down to 92.7% of their 2004 values (derived from http://www.communities.gov.uk/publications/planningandbuilding/commercialfloorspace)

Traffic between zones is proportional both to the floorspace in the origin zone and to the floorspace in the destination zone. The relationships are scale factors:
(zone floorspace) / (average zone floorspace).

Therefore doubling the floorspace in both the origin and destination zones in isolation would roughly quadruple the traffic because changing 2 zones in isolation has little impact on the average zone floorspace. However any blanket changes have no impact because any individual floorspace is changed by the same proportion as the average

Therefore there is no change to GBFM's tonnage after blanket-changing the floorspace areas because the total demand for freight cargo in Great Britain is itself assumed fixed by consumer demand; it is not generated by the addition of warehousing space.

There is a more detailed back-casting example in section 6 of the main GBFM Version 5.0 report.

2. GBFM FILE GUIDE - GBFM INPUT AND OUTPUT FILE REFERENCE

2.1 File Summary

The file list is organised according to location. There are seven sub-folders in the main folder: /gbfm_5_2004/gbfmdata/

- 2.2. BaseMat: Input files for the base matrix.
- 2.3 ForeCasts: Files used to generate trend forecasts.
- 2.4 Inputs: Inputs for the transportation model.
- 2.5 Maps: Geo-coded inputs, e.g. zones, network links.
- 2.6 Outputs: Results from the model.
- 1.9 Scenarios: User scenarios.

2.2 BaseMat: Inputs for the Base Matrix.

country_convert.csv

File Format:

Field	Description	Data Format	Example
NPAR	Trade Data - TransDb Country Code	Integer	1010
CODSEQ	Trade Data - HMRC Country Code	Integer	1
CODALPH	Trade Data - HMRC Country Code	Text	FR
CODNAME	Country Name	Text	FRANCE
WREG	World Region	Integer	1
FCC	Trade Forecast Country Code	Integer	1

Software Required: Text editor or Spreadsheet.

Description of Use: Converts between different country coding systems, allowing for example, trade forecasts to be matched up to trade data.

Editing Options: Only needs to be updated if future trade data inputs contain new country codes. No modelling uses.

csrgt_2004_in.csv

File Format:

Field	Description	Data Format	Example
O_COUNTY	Origin County	Integer	1
D_COUNTY	Destination County	Integer	1
NST2	NST Commodity Code	Integer	1
TONNES	Tonnes Lifted per Annum	Float	4189.38

Software Required: Text editor or Spreadsheet.

Description of Use: Main source of GB domestic road freight flows, from the DfT's Continuing Survey of Road Goods Transport (CSRGT). Based on merged data from 1999-2004, factored up to 2004 knowns.

Editing Options: Needs to be updated annually. No modelling uses.

etis_2004_in.csv

File Format:

Field	Description	Data Format	Example
IMPEXP	Import or Export Direction	Text	Exp
NPAR	Country of Origin Or Destination	Integer	1700
NST2	NST Commodity Code	Integer	12
NUTS2	European Regional Code	Text	BE21
TLIFT	Annual Tonnes Lifted	Float	11.00

Software Required: Text editor or Spreadsheet.

Description of Use**: **Derived from the 2001 ETIS-Base database, relating UK trade by country to European zones. Used in GBFM to split known European trade flows from countries to regions.

Editing Options: If updates are available, it should be updated annually. No modelling uses.

gravityresults02.csv

File Format:

Field	Description	Data Format	Example
NST	NST Commodity Code	Integer	0
SIC1-10	Standard Industrial Code	Integer	1
K	Gravity Model 'K' Parameter	Float	0.007475
N	Gravity Model 'N' Parameter	Float	0.500528

Software Required: Text editor or Spreadsheet.

Description of Use: Connects the commodities moved e.g. NST 89 (Chemical Products) to the industries that produce them e.g. SIC 24 (Manufacture of Chemicals). Up to ten SICs can be associated with any given NST. The 'K' parameter and 'N' parameter are estimated for each product group, and used in the formula:

*Tij = k * Pi * Pj * pow(Dij,-n)*

Where: Tij is the tonnage between zones i and j, Pi is the population at i, Pj is the population at j, Dij is the distance between i and j. The populations are employee counts in industries that generate and receive the given commodity in zones i and j respectively.

Editing Options: The parameters were derived using survey data from 2003. However, this model can be updated annually without updating the survey. Changing the parameters affects the distribution of traffic in any given category, and the distance decay effect. This may slightly upset the calibration in the base year, so GBFM should be re-calibrated if changes are made.

iotable_survey.csv

File Format:

Field	Description	Data Format	Example
SIC-PROD	Producer Standard Industrial Code	Integer	1
SIC-DEST	Destination Standard Industrial Code	Integer	1
WEIGHT	Statistical Weight	Float	46.0

Software Required: Text editor or Spreadsheet.

Description of Use: Determines whether any two industry types exchange goods. It acts as an Input-Output table, but the weighting is based upon survey data rather than standard monetary input output tables. An input output

relationship may exist between two industry categories even if there is no financial transaction, or change of ownership. The statistical weighting is based upon the quantity of freight exchanged, rather than the value.

Editing Options: The values were derived using survey data observed in 2003. Ideally the survey should be extended and updated, but so far no further data have been gathered.

map_doms_00.csv

File Format:

Field	Description	Data Format	Example
OCOUNTY	Origin County	Integer	10
DCOUNTY	Destination County	Integer	10
NST	NST Commodity Code	Integer	12
ACTUAL	Actual Tonnage	Float	39231.6
ESTIMATE	Estimated Tonnage	Float	106148
FACTOR	Estimate/Actual	Float	2.70567

Software Required: Text editor or Spreadsheet.

Description of Use: Technically this is a GBFM output, produced by the 'New Base Matrix' routine. However it is an *input* for the 'Forecast Base Matrix' procedure. It contains the weights required to constrain the gravity model so that it replicated CSRGT traffic flows.

Editing Options: This file should only be modified by GBFM, but it can be used to assess the errors produced by the unconstrained gravity model. Better initial estimates will result in factors closer to 1.0.

pcd_m2_type_001.csv

File Format:

Field	Description	Data Format	Example
GIS_ID	ID Number	Integer	8919
NM1	Zone Name 1, Postcode (Space)	Text	AB 1
NM2	Zone Name 2, Postcode (No Space)	Text	AB1
WEIGHT	Number of Bulk Delivery Addresses	Float	150.0
RETAIL_M2	Retail Floorspace	Float	72.0
OFFICES_M2	Office Floorspace	Float	87.0
WAREHOUSE_M2	Warehouse Floorspace	Float	101.0
FACTORIES_M2	Factories Floorspace	Float	151.0

Software Required: Text editor or Spreadsheet.

Description of Use: A file containing a summary of land use within each postcode district. The weight field has been taken from the GBFM 4 map containing the postcode district shapes, and shows the number of bulk delivery points in the zone. The remaining fields have been taken from ODPM land use data. Originally broken down by ward, a spatial overlay procedure has been used to convert to postcode districts. Scottish data has been estimated from the employment data. See 'Floorspace_reg_model.xls'. Note that the file has two sets of postcode labels, one with spaces (e.g. B 1) and one without (e.g. B1). This is to allow cross-referencing with other databases that may use one convention only.

Editing Options: This input file can be used to store preset forecasts of land use, enabling this to be incorporated into a GBFM forecast. The 'Forecast Base Matrix' dialog allows edited land use forecasts to be selected.

pcd_sic_01_all_nm.csv

File Format:

Field	Description	Data Format	Example
NM_SPACE	Postcode Zone (Space)	Text	AB 1
SIC CODE	Zone Name 1, Postcode	Text	AB10
BUSINESS COUNT	Number of Businesses	Integer	2
EMPLOYEE COUNT	Number of Employees	Integer	1

Software Required: Text editor or Database.

***Description of Use*: Contains records showing the importance of any given industry in a particular postcode zone, originally taken from the Blue Sheep (http://www.bluesheep.com) market research database.** It is used in the gravity model to work out the volumes of traffic between any two given zones

Editing Options: This input file can be used to store preset employment forecasts of land use, enabling this to be incorporated into a GBFM forecast. The 'Forecast Base Matrix' dialog allows edited employment forecasts to be selected.

port_convert.csv

File Format:

Field	Description	Data Format	Example
PORTSEQ	HMRC Port Code	Integer	1
PORTNAME	HMRC Port Name	Text	LONDON
PORTALPH	HMRC Port Alpha Code	Text	LON
LPC	GBFM Long Port Code	Integer	2701

Software Required: Text editor or Spreadsheet.

***Description of Use:* A simple conversion table providing a link between Customs (HMRC) data and GBFM**

*Editing Options:*Any new port codes appearing in the trade data would need to be added to this list.

sitc1-n digit.txt

File Format:

Field	Description	Data Format	Example
SITC	Commodity	Integer	1015
SHARE	Unitised Share	Float	0.327541232

*Software Required:*Text editor or Spreadsheet.

Description of Use: A set of conversion tables based on UK trade data allowing trade tonnes to be split into two basic modes of transport; unitised and conventional.

*Editing Options:*Should not be edited.

2.3 Forecasts: Files used to generate trend forecasts.

dom_grow_2004_00.csv

File Format:

Field	Description	Data Format	Example
YEAR	Year	Integer	1980
MANUFOUTPUT	UK Manufacturing Output	Float	100.0

Software Required: Text editor or Spreadsheet. Also see 'dom_grow_2004_00_model.xls.

Description of Use: This file (or an equivalent one) is selected via the GBFM scenario. It contains historical and forecast trends in manufacturing output, allowing GBFM to produce forecasts from a fixed base year matrix. The accompanying Excel file shows why manufacturing output was used to connect levels of economic growth to traffic growth, and how the parameters were calculated. The parameters have also been fed into GBFM via the '/inputs/para_base_2004_01.csv' file under the headings 'macfcst_par_a' and 'macfcst_par_a'.

Editing Options: These inputs should be updated annually to keep the model up to date. Furthermore the user can introduce alternative forecast scenarios with higher or lower growth rates in manufacturing output. Alternative scenarios should be saved in /forecasts with new file names and selected as part of a GBFM scenario in the 'Scenario' table, cell F10.

trd_grow_2004_00.csv

File Format:

Field	Description	Data Format	Example
DIR	Direction (Import/Export)	Integer	1
COM	Commodity	Integer	0
PAR	Partner Country	Integer	1
MOD	Mode	Integer	0
RATE	Growth Rate	Float	0.949074

Software Required: Text editor or Database.

Description of Use:**These are forecasts taken from MDS Transmodal's FORK trade forecasting model.** A description of the FORK methodology is given at the end of MDS Transmodal's "UK Port Demand Forecasts to 2030" report (pages 213 – 217):
http://www.dft.gov.uk/consultations/archive/2006/ppr/ukportdemandforecaststo2030.pdf

GBFM bases its international traffic forecasts entirely on these growth rates. Each combination of country, commodity, direction and mode has a unique growth rate.

Editing Options: These inputs should be updated annually to keep the model up to date. The original file for the 2004 calibration was created by merging 'UKImpGrow2004_03.csv' and 'UKExpGrow2004_03.csv' into a single stream with both directions listed. The two files were produced with the UKGROW program, and modified manually so that the bulk forecasts agreed more closely with the DfT Ports Forecasts published 2005. The modification essentially involves lower volumes of trade in energy products than would have been predicted by FORK which uses historical trends.

2.4 Inputs: Input files for GBFM Transportation Model.

intl_base_2004_01.csv

File Format:

Field	Description	Data Format	Example
GBZONE	GB Postcode District (space)	Text	BB 6
INT_EXT	Intra or Extra EU Trade	Text	Ext
IMP_EXP	Imports or Exports	Text	Exp
NPAR	Partner Country	Text	1240
OSZONE	Overseas Zone (Europe only)	Text	DE94
SITC2	2 Digit SITC Commodity	Integer	72
NST2	2 Digit NST/R Commodity	Integer	93
BASICMODE	Basic Mode: Bulk, Unitised	Integer	1
SEAMODE	Overseas Mode	Integer	1
PORTSEQ	GB Long Port Code	Integer	604
TONNES	Annual Tonnes	Float	11.0

Software Required: Text editor or Database.

Description of Use: This is the flow matrix covering international trips that GBFM will process into transport chains.

Editing Options: The user can modify this file directly in order to set up any given forecast scenario, i.e. treating *overseas* freight flows as exogenous to the model. The best method would be to link the file to an Access database, and to modify it using 'update' queries. It can then be saved under a different file name, changing the year or the version suffixes, which the GBFM user can then select in the main dialog.

pdms_base_2004_01.csv

File Format:

Field	Description	Data Format	Example
GBORIGZONE	GB Postcode District (space)	Text	BB 6
GBDESTZONE	GB Postcode District (space)	Text	AB11
NST2	2 Digit NST/R Commodity	Integer	32
SITC2	2 Digit SITC Commodity	Integer	33
TONNE S	Annual Tonnes	Float	540.0

Software Required: Text editor or Database.

Description of Use: This is the flow matrix covering pure domestic trips that GBFM will process into transport chains.

Editing Options: The user can modify this file directly in order to set up any given forecast scenario, i.e. treating *domestic* freight flows as exogenous to the model. The best method would be to link the file to an Access database, and to modify it using 'update' queries. It can then be saved under a different file name, changing the year or the version suffixes, which the GBFM user can then select in the main dialog.

para_base_2004_01.csv

File Format:

Field	Description	Data Format	Example
PARAMETER	Model Parameter	Text	ValOfTime
VALUE	Parameter Value	Float	0.00104167
COMMENTS	Description of Parameter	Text	% of Freight Rate

Software Required: Text editor.

Description of Use: Contains the parameters that control the model, such as value of time and the F-Logit parameter.

Editing Options: The parameters can be edited directly. When the model is updated and recalibrated the parameter values can also be revisited.

rail_links_2004_00.csv

File Format:

Field	Description	Data Format	Example
LINKID	Link ID Number	Integer	1
OPCD	Origin Postcode District	Text	AB24
OPORT	Origin Port Code (if applicable)	Integer	1702
DPCD	Destination Postcode District	Text	FK 1
DPORT	Destination Port Code (if applicable)	Integer	5501
GBFMBUSINESSCODE	GBFM Rail Business Code	Integer	1
GBFMBUSINESS	GBFM Business	Text	Domestic Intermodal
FREQ	Service Frequency: Trains Per Annum	Float	1023
TRAFFICTONNES	Actual Annual Tonnes	Float	17042.4
CAPAC	Estimated Annual Capacity	Float	25563.6
CALIB	Calibration Factor	Float	0.58703

Software Required: Text editor or Spreadsheet.

Description of Use: Contains a simplified list of *domestic* rail services based on Network Rail records of actual rail freight traffic in 2004. Services into or out of ports are listed with port codes next to the origin or destination. They are grouped according to rail business codes.

Editing Options: The parameters can be edited directly and should be updated each year. There is no mechanism by which new rail facilities will automatically generate services, so these must be specified in advance for an 'improved connectivity' scenario. Alternative scenarios can be selected by presetting the name of the rail links file inside the Scenario.

road_calib_vkm_00.csv

File Format:

Field	Description	Data Format	Example
CATEGORY16	HGV Category (0-15)	Integer	0
CAPKVKM	Annual Capacity in Vehicle Kms	Float	5740000
CALIB	Calibration Factor	Float	0.80908

Software Required: Text editor or Spreadsheet.

*Description of Use:*Contains capacity limits for each vehicle category, based on the DfT figures relating to the stock of HGVs.

Editing Options: The capacity figures can be edited directly and should be updated each year. The calibration can be carried out using the supplied routines, or by manual means if necessary.

sea_b_links_2004_00.csv

File Format:

Field	Description	Data Format	Example
GB_PORT	Long Port Code	Integer	101
SITC1	Commodity Sector SITC 1 Digit	Integer	5
OS_PORT	Overseas Port (place-holder)	Text	XXX
OPERATOR	Service Operator (place-holder)	Text	XXX
FREQUENCY	Service Frequency Per Day (Always=1)	Float	1.0
MINUTES	Service Minutes (Always=1)	Float	1.0
GBPS	Service Cost (Always=100)	Float	100.0
CAPAC	Service Capacity in Tonnes	Float	9000.0
CALIB	Calibration Factor	Float	1.8167
DIRECTION	Import of Export	Text	Imp
TRAFFIC	Annual Tonnes	Float	3592.96

Software Required: Text editor or Spreadsheet.

*Description of Use:*Contains open ended services, i.e. specific GB port to all possible destinations, for intra-European bulk traffic flows. The services are based on known GB port traffics taken from DfT Maritime Statistics.

Editing Options: The services can be edited directly and should be updated each year. The calibration can be carried out using the supplied routines, or by manual means if necessary.

sea_u_links_2004_00.csv

File Format:

Field	Description	Data Format	Example
GB_PORT	Long Port Code	Integer	2905
SEA_MODE	Sea Mode	Integer	2
OS_PORT	Overseas Port	Text	CLS
OPERATOR	Service Operator	Text	Eurotunnel
FREQUENCY	Service Frequency Per Day	Float	100.0
MINUTES	Service Minutes	Float	35.0
GBPS	Service Cost	Float	130.0
CAPAC	Annual Service Capacity in Units	Float	3000000.0
CALIB	Calibration Factor	Float	0.776034
TRAFFICUNITS	Annual Traffic in Units	Float	1281207.0

Software Required: Text editor or Spreadsheet.

*Description of Use:*Contains scheduled unitised services, between GB, the Continent and Ireland.

Editing Options: The services can be edited directly and should be updated each year. The calibration can be carried out using the supplied routines, or by manual means if necessary.

sitratio.csv

File Format:

Field	Description	Data Format	Example
SITC	Commodity: 2 Digit SITC	Integer	33
VAL/TON	Value Per Tonne	Float	4.8721
VOL/TON	Volume Per Tonne	Float	7.6755
ARG:URG	Accompanied Unaccompanied Ratio	Float	32.6694
RO:LO	RoRo to LoLo Ratio	Float	100.0

Software Required: Text editor or Spreadsheet.

*Description of Use:*Contains commodity attributes required for mode choice calculations, based upon trade data.

Editing Options: These ratios are intended to be permanent, and related to the physical characteristics of the goods. However, it may be useful to review them periodically.

toll_spd_2004_00.csv

File Format:

Field	Description	Data Format	Example
RDTYPE	Road Type	Integer	1
ARTYPE	Area Type	Integer	1
DYNAMIC	Dynamic Speed Parameter (not used)	Float	1.0
STATIC	Static Speed Parameter	Float	1.0
VT_n	Toll for Given Vehicle Type 'n'	Float	0.0

Software Required: Text editor or Spreadsheet.

*Description of Use:*Allows tolls to be added according to road type, area type and vehicle type. The tolls should be entered as pence per kilometre for the heaviest vehicle in a given category. Road Types: 1 = Motorway; 2 = Trunk Dual,3 = Principal Dual, 4 = Trunk Single, 5 = Principal Single, 6 = B Road. Area Types: 1 = Central London, 2 = Inner London, 3 = Outer London, 4 = Inner Conurbations, 5 = Outer Conurbations, 6 = Urban Big, 7 = Urban Large, 8 = Urban Medium, 9 = Urban Small, 10 = Rural.

Vehicle types can referenced in the scenario spreadsheet. The dynamic speed parameter is no longer used, but the static speed parameter can be used to approximate changes in speed for road links with a given road type and area type. The entered value is multiplied by the default speed. The default value is 1.0.

Editing Options: These inputs are intended to be neutral in the calibrated base year, but can be changed within a forecast scenario.

2.5 Maps: GIS data used by GBFM

county_001.mif/mid

File Format:

Field	Description	Data Format	Example
NAME	County Name	Text	Fife
CODE	GBFM County Code	Integer	56

Software Required: Text editor or GIS package.

Description of Use: A GB map with the 1972 Local Government Act county boundaries for England and Wales, and the 1973 Local Government (Scotland) Act regional boundaries for Scotland. Allows postcodes to be attached to county codes using point in polygon searches, allowing data aggregation.

Editing Options: There is no reason to modify this input unless it becomes necessary to use an alternative coding system, or a different set of high level zones e.g. NUTS3. Note: the NUTS3 system is different.

eunetwork_001.csv

File Format:

Field	Description	Data Format	Example
ORIG_NUTS2	Origin Region NUTS2	Text	AL11
ORIG_NAME	Origin Name	Text	Albania
DEST_NUTS2	Destination Region NUTS2	Text	AT11
DEST_NAME	Origin Name	Text	Burgenland
RD_KMS	Road Distance Kms	Float	1004.79
RD_MINS	Road Journey Time Minutes	Float	2050.20
RD_EUROS	Road Cost Euros	Float	1427.40
RL_KMS	Rail Distance Kms	Float	1004.79
RL_MINS	Rail Journey Time Minutes	Float	2050.20
RL_EUROS	Rail Cost Euros	Float	1427.40
RL_SERV_EXISTS	Rail Service Flag	Boolean	1
RL_SERV_MINS	Rail Service Minutes	Float	2248.50
RL_SERV_FREQ	Rail Service Frequency per Annum	Float	312.00
CF_KMS	Geometric Distance	Float	609.65

Software Required: Text editor or Database.

Description of Use: A description of network times, distances, and costs by road and rail within Continental Europe. The data is taken from the ETIS-BASE system.

Editing Options: Ideally this would be updated at least every five years to account for changing road and rail haulage costs.

mainroads_014.mif/mid

File Format:

Field	Description	Data Format	Example
GBFM_ID	GBFM ID Code	Integer	1
AREA17	Area Type Code	Text	CM
SUBREGION	Sub-Region Code	Integer	19
ROADTYPE	Road Type	Integer	1
LINKID	Link ID	Integer	161763
SPEED	Link Speed (For a Car) in kph	Float	104.0
SLMCAT	Sensitive Lorry Mile Category	Integer	2
TOLL	Road Toll (pence/km)	Integer	0

Software Required: Text editor or GIS package.

Description of Use: A GB map with road links.

Editing Options: Changes in link speed, external costs (SLMs), and tolls can be set here.

pcdwgt_002.mif/mid

File Format:

Field	Description	Data Format	Example
NM1	Postcode District Name (1) - with Spaces	Text	RG 8
NM2	Postcode District Name (2) - With Spaces	Text	RG 8
WEIGHT	Number of Bulk Delivery Points	Integer	85

Software Required: Text editor or GIS package.

Description of Use: A GB map with polygons representing postcode district boundaries. The NM1 and NM2 fields are normally identical, both containing the fixed format postcode (padded with spaces), but in some cases the NM2 field is blank, so NM1 is preferred. The population weighting, based on bulk delivery points (companies receiving large amounts of mail), is read into GBFM but not used as part

of the gravity model. It is only used in the model to estimate floorspace for zones with no floorspace data.

Editing Options: There is no reason to modify this file.

ports_002.mif/mid

File Format:

Field	Description	Data Format	Example
CODE	Databank Port Code	Text	AAR
PORT	Port Name	Text	AARHUS
COUNTRY	Country	Text	DENMARK
CCODE	Country Code	Float	80.0
WORLDREG	World Region	Float	1.00
WTEXT	World Region Text	Text	Northern Europe
LATITUDE	Port Location: Latitude	Float	56.15
LONGITUDE	Port Location: Longitude	Float	10.22
TYPE	Type of Match to NUTS2	Float	1.00
NUTS2	NUTS2 Code	Text	DK00

Software Required: Text editor or Spreadsheet.

Description of Use: A list of ports and a reference to NUTS 2 codes allowing sea services between ports to be related to Continental NUTS 2 codes.

Editing Options: This only needs to be modified if new services are created into new ports.

railways_001.mif/mid

File Format:

Field	Description	Data Format	Example
ID	Link ID	Integer	59373
DESC	Link Description	Text	Intercity (BR) Line
FCODE	Additional Link Type Code	Text	4211
GAUGE	Loading Gauge Category	Integer	6

Software Required: Text editor or GIS Software.

Description of Use: A GB map of rail links.

Editing Options: This does not need to be modified.

stanox_003.mif/mid

File Format:

Field	Description	Data Format	Example
ID_2	ID Code	Integer	122
STANOX_2	Stanox Code	Text	1001
TIPLOC	Tiploc Code	Text	THURSO
LONGNAME	Long Name	Text	THURSO
CODE	County Code	Integer	61
NM1	Postcode District	Text	KW14

Software Required: Text editor or GIS Software.

Description of Use: A GB map of rail nodes, allowing rail traffic flows to be related to postcode and county zones.

Editing Options: This does not need to be modified.

towns_004.mif/mid

File Format:

Field	Description	Data Format	Example
ID	ID	Integer	3
NAME	Town Name	Text	Abergavenny
NM1	Postcode District (Space)	Text	NP 7
LP_CODE	Long Port Code (If a Port)	Float	0.00

Software Required: Text editor or GIS Software.

Description of Use: A map of GB towns, allowing services (between towns) to be linked to postcodes and port codes.

Editing Options: This does not need to be modified unless new codes are required. There is no limit to the number of towns that can be included.

2.6 Outputs: GBFM Output Files

Output files are stored under folder names which correspond to the name of the input scenarios. A scenario called 'scenario_01.xls' will produce output in a folder called '/scenario_01/'.

2.7 Naming Conventions

The files can be classified into five categories: LOG files show the settings used to generate the outputs, GB_???_S? files contain summary tables with complete (GB) sets of traffic flows, GB_??? files contain the detailed results from which the summaries were constructed, INTL files contain international flows only, and PDMS files contain pure domestic flows only (i.e without the domestic legs of international trips). FNW means freight network, FOD means freight OD, and the suffixes RD, RAIL and SEA are used when the file covers a single mode only.

2.8 Log Files

log_intl.txt and log_pdms.txt

File Format:

Software Required: Text editor or word processor.

Description of Use: A record of the input settings, allowing any existing results to be repeated. The settings for the international module will be identical to those for the domestic module.

2.9 Summary Files

gb_fnw_s1.csv

File Format:

Field	Description	Data Format	Example
GBREGION	GB GO Region	Integer	1
AREA TYPE	Area Type	Integer	4
ROADTYPE	Road Type	Integer	4
RIGIDVKMS	Rigid HGV Kms	Float	2163169.41
ARTICVKMS	Articulated HGV Kms	Float	617960.84
TOTALVKMS	Total HGV Kms	Float	2781130.25

Software Required: Text editor or Spreadsheet.

Description of Use: A summary of the road traffic assignment, showing vehicle kilometres, broken down by two vehicle categories (rigid and articulated), eleven Government Office regions, ten area types, and six road types. It replaces the previous GBAM_OUT in GBFM 4.

gb_fod_s1.csv

File Format:

Field	Description	Data Format	Example
NST1CODE	NST 1 Digit Commodity Code	Integer	1
NST1DESC	NST 1 Digit Commodity Description	Text	Agri Food
ROADT	Road Tonnes	Float	338573040.8
RAILT	Rail Tonnes	Float	8445742.1
TOTALT	Total Tonnes	Float	347018782.9
ROADTKMS	Total Road Tonne Kms	Float	34581217552.1
RAILTKMS	Total Rail Tonne Kms	Float	34581217552.1
TOTALTKMS	Total Tonne Kms	Float	36396539314.7
ROADVKMS	Rail HGV Kms	Float	4046667372.2

Software Required: Text editor or Spreadsheet.

Description of Use: A summary of the main aggregate quantities, showing inland mode share by the ten 1-Digit NST categories with tonnes, tonne kms and vehicle kms.

gb_fod_s2.csv

File Format:

Field	Description	Data Format	Example
CATEGORY16	Vehicle Category (Coded 0-15)	Integer	0
VKM	Annual Vehicle Kms (000s)	Float	3388823627.3

Software Required: Text editor or Spreadsheet.

Description of Use: Total road traffic by vehicle category. Used by the calibration routine.

2.10 GBFM Main Output Databases

gb_rd_fnw.mid/mif

File Format:

Field	Description	Data Format	Example
ROAD_LINK_ID	Road Link ID Number	Integer	27579
AREA TYPE	Area Type	Integer	5
GB_ZONE	GB Postcode Zone	Text	OL 7
GB_COUNTY	GB County	Integer	43
GB_REGION	GB GO Region	Integer	9
ROAD_TYPE	Road Type	Integer	1
SPEED	Road Speed (Free Flow Car Kph)	Integer	54
SLM_CAT	Sensitive Lorry Miles Category	Integer	1
KMS	Link Length Kms	Float	5.954
TONNES	Annual Tonnes Loaded onto Link	Float	10381517.1
RIGIDS	Annual Rigid HGV Trips	Float	1305291.8
ARTICS	Annual Articulated HGV Trips	Float	633691.7
HGVS	Annual HGV Trips	Float	1938983.6
TOLL	Toll Revenue	Float	0
FUEL_CONS	Annual Fuel Consumption, Litres	Float	1417748.2

Software Required: Text editor or GIS Software.

Description of Use: A complete record of the road traffic assignment measured in vehicle trips per annum (rigid and articulated), showing ten area types, six road types, toll revenue, litres of diesel consumed and external costs.

gb_fod.csv

File Format:

Field	Description	Data Format	Example
INT_DOM	International or Domestic	Text	Int
ORIGZONE	Origin Postcode	Text	AB10
DestZone	Destination Postcode	Text	DD 1
NST2	Commodity Code NST 2 Digit	Integer	89
SITC2	Commodity Code SITC 2 Digit	Integer	55
TONNES	Annual Tonnes	Float	16.68
VEHTYPE	Vehicle Type (Codes 0 to 15)	Int	15
HGVs	Annual HGV Trips	Float	1.10973
INLANDMODE	Inland Mode(Road/Rail)	Text	Road
INLANDKMS	Inland Kms	Float	104.326

Software Required: Text editor or Database.

Description of Use: A complete record of the multimodal origin destination flows, merged from the international and domestic modules into a harmonised format.

2.11 GBFM International Module Outputs

intl_fod1.csv

File Format:

Field	Description	Data Format	Example
IMPEXP	Imports (1) or Exports (2)	Integer	2
ORIGZONE	Origin Postcode	Text	AB10
DestZone	Destination Postcode	Text	DD 1
NST2	Commodity NST 2 Digit	Integer	89
SITC2	Commodity SITC 2 Digit	Integer	55
BASICMODE	Basic Mode: Unit/Bulk/NonSea	Integer	1
SEAMODE	Sea Mode: Bulk,Argv,Urgv,Lolo	Integer	1
GBPORT	GB Long Port Code	Integer	5802
SEALINK	Sea Service Code or -1 if Bulk	Integer	-1
TONNES	Annual Tonnes	Float	166.8
VEHTYPE	Vehicle Type 0-15	Integer	15
HGVs	Annual HGV Trips	Float	7.24
GBLANDMODE	GB Inland Mode Codes:5-9	Integer	9
GBLANDKMS	GB Inland Kms	Float	104.3
OSNPAR	Overseas Country Code (TransDB Codes)	Integer	1280
OSNUTS2	Overseas NUTS Zone Code - NUTS2	Text	NO01
OSLANDMODE	Overseas Land Mode: 5-9	Integer	9
OSLANDKMS	Overseas Land Kms	Float	59.7

Software Required: Text editor or Database.

Description of Use: A temporary file. This should not be used as a result.

intl_fod2.csv

File Format:

Field	Description	Data Format	Example
IMPEXP	Imports (1) or Exports (2)	Integer	2
ORIGZONE	Origin Postcode	Text	AB10
DestZone	Destination Postcode	Text	DD 1
GBTERM1	Origin GB Inland Terminal	Text	IP11
GBTERM2	Destination GB Inland Terminal	Text	ML 5
NST2	Commodity NST 2 Digit	Integer	89
SITC2	Commodity SITC 2 Digit	Integer	55
BASICMODE	Basic Mode: Unit/Bulk/NonSea	Integer	1
SEAMODE	Sea Mode: Bulk,Argv,Urgv,Lolo	Integer	1
GBPORT	GB Long Port Code	Integer	5802
SEALINK	Sea Service Code or -1 if Bulk	Integer	-1
GBLINK	Inland Service Code or -1 if Bulk	Integer	-1
TONNES	Annual Tonnes	Float	166.8
VEHTYPE	Vehicle Type 0-15	Integer	15
HGVs	Annual HGV Trips	Float	7.24
GBRDKMS1	GB Inland Road Kms, Origin to First Terminal	Float	104.3
GBRLKMS	GB Inland Rail Kms, First to Second Terminal	Float	104.3
GBROADKMS2	GB Inland Road Kms, Second Terminal to Destination	Float	104.3
OSNPAR	Overseas Country Code (TransDB Codes)	Integer	1280
OSNUTS2	Overseas NUTS Zone Code - NUTS2	Text	NO01
OSLANDMODE	Overseas Land Mode: 5-9	Integer	9
OSLANDKMS	Overseas Land Kms	Float	59.7

Software Required: Text editor or Database.

Description of Use: A complete set of results from the international module, in O/D format with the full land-sea-land trip chains set out in the record structure.

intl_rail_fnw.csv

File Format:

Field	Description	Data Format	Example
LINKID	Link ID Code	Integer	1
OPCD	Origin Postcode	Text	AB24
OPORT	Origin Port Code (if applicable)	Integer	0
DPCD	Destination Postcode	Text	FK 1
DPORT	Destination Port Code (if applicable)	Integer	5505
GBFMBUSINESSCODE	GBFM Rail Business Code	Integer	1
GBFMBUSINESS	Rail Business Description	Text	DOM INTL
FREQ	Annual Service Frequency	Integer	1023
TRAFFICTONNES	Estimated Traffic Volume - Tonnes	Float	12158.2
CAPAC	Actual Capacity - Tonnes	Float	25563.6
CALIB	Calibration Value	Float	0.987

Software Required: Text editor or Spreadsheet

Description of Use: A summary of the link by link traffic volumes for GB rail services.

intl_rd_fnw.mid/mif

File Format:

Field	Description	Data Format	Example
ROAD_LINK_ID	Road Link ID Number	Integer	19558
AREA TYPE	Area Type	Integer	9
GB_ZONE	GB Postcode Zone	Text	TR20
GB_COUNTY	GB County	Integer	33
GB_REGION	GB GO Region	Integer	7
ROAD_TYPE	Road Type	Integer	5
SPEED	Road Speed (Free Flow Car Kph)	Integer	30
SLM_CAT	Sensitive Lorry Miles Category	Integer	1
KMS	Link Length Kms	Float	5.954
TONNES	Annual Tonnes Loaded onto Link	Float	10381517.1
RIGIDS	Annual Rigid HGV Trips	Float	1305291.8
ARTICS	Annual Articulated HGV Trips	Float	633691.7
HGVS	Annual HGV Trips	Float	1938983.6
TOLL	Toll Revenue	Float	0
FUEL_CONS	Annual Fuel Consumption, Litres	Float	1417748.2

Software Required: Text editor or GIS Software.

Description of Use: International road traffic assignment measured in vehicle trips per annum (rigid and articulated), showing ten area types, six road types, toll revenue, litres of diesel consumed and external costs.

intl_sea_fnw_b1.csv

File Format:

Field	Description	Data Format	Example
GB_PORT	Long Port Code	Integer	102
SITC1	Commodity Sector SITC 1 Digit	Integer	0
OS_PORT	Overseas Port (place-holder)	Text	XXX
OPERATOR	Service Operator (place-holder)	Text	XXX
FREQUENCY	Service Frequency Per Day (Always=1)	Float	1.0
MINUTES	Service Minutes (Always=1)	Float	1.0
GBPS	Service Cost (Always=100)	Float	100.0
CAPAC	Service Capacity in Tonnes	Float	000.0
CALIB	Calibration Factor	Float	1.8167
DIRECTION	Import of Export	Text	Imp
TRAFFIC	Annual Tonnes	Float	3592.96

Software Required: Text editor or Spreadsheet.

*Description of Use:*Contains traffic assignments on open ended bulk services, i.e. specific GB port to all possible destinations, for intra-European bulk traffic flows.

intl_sea_fnw_u1.csv

File Format:

Field	Description	Data Format	Example
GB_PORT	Long Port Code	Integer	2905
SEA_MODE	Sea Mode (1-4)	Integer	2
OS_PORT	Overseas Port	Text	CLS
OPERATOR	Service Operator	Text	Eurotunnel
FREQUENCY	Service Frequency Per Day	Float	100.0
MINUTES	Service Minutes	Float	35.0
GBPS	Service Cost (GBP)	Float	130.0
CAPAC	Service Capacity in Units	Float	3000000.0
CALIB	Calibration Factor	Float	0.97
TRAFFICUNITS	Annual Units	Float	865000.0

Software Required: Text editor or Spreadsheet.

*Description of Use:*Contains traffic assignments on unitised international services. This is an intermediary file which should not be used. See Intl_Sea_Fnw_u2.csv (below). The U1 file is based on loaded trips only. The U2 file includes empty trips, and therefore provides an estimate of the total market.

intl_sea_fnw_u2.csv

File Format:

Field	Description	Data Format	Example
GB_PORT	Long Port Code	Integer	2905
SEA_MODE	Sea Mode (1-4) or Rail (5)	Integer	2
OS_PORT	Overseas Port	Text	CLS
OPERATOR	Service Operator	Text	Eurotunnel
FREQUENCY	Service Frequency Per Day	Float	100.0
MINUTES	Service Minutes	Float	35.0
GBPS	Service Cost (GBP)	Float	130.0
CAPAC	Service Capacity in Units	Float	3000000.0
CALIB	Calibration Factor	Float	0.97
TRAFFICUNITS	Annual Units	Float	1641000.0

Software Required: Text editor or Spreadsheet.

*Description of Use:*Contains traffic assignments on unitised international services. This file includes empty trips, and therefore provides an estimate of the total market.

pdms_fod1.csv

File Format:

Field	Description	Data Format	Example
ORIGZONE	Origin Postcode	Text	AB10
DestZone	Destination Postcode	Text	AB11
NST2	Commodity Code NST 2 Digit	Integer	31
SITC2	Commodity Code SITC 2 Digit	Integer	99
LINK	Link Code if Intermodal or -1	Integer	-1
TONNES	Annual Tonnes	Float	393.5
VEHTYPE	Vehicle Type (Codes 0 to 15)	Int	0
HGVs	Annual HGV Trips	Float	357.7
INLANDMODE	Inland Mode Codes 5-9	Integer	9
INLANDKMS	Inland Kms	Float	2.6

Software Required: Text editor or Database.

Description of Use: Pure domestic origin destination flows. A temporary file. Do not use.

pdms_fod2.csv

File Format:

Field	Description	Data Format	Example
ORIGZONE	Origin Postcode	Text	AB10
DestZone	Destination Postcode	Text	AB11
NST2	Commodity Code NST 2 Digit	Integer	31
SITC2	Commodity Code SITC 2 Digit	Integer	99
LINK	Link Code if Intermodal or -1	Integer	-1
TONNES	Annual Tonnes	Float	393.5
VEHTYPE	Vehicle Type (Codes 0 to 15)	Int	0
HGVs	Annual HGV Trips	Float	357.7
INLANDMODE	Inland Mode Codes 5-9	Integer	9
INLANDKMS	Inland Kms	Float	2.6

Software Required: Text editor or Database.

Description of Use: Pure domestic origin destination flows. Each leg of any multimodal trip is output as a separate record.

pdms_rail_fnw.csv

File Format:

Field	Description	Data Format	Example
LINKID	Link ID Number	Integer	1
OPCD	Origin Postcode District	Text	AB24
OPORT	Origin Port Code (if applicable)	Integer	0
DPCD	Destination Postcode District	Text	FK 1
DPORT	Destination Port Code (if applicable)	Integer	5501
GBFMBUSINESSCODE	GBFM Rail Business Code	Integer	1
GBFMBUSINESS	GBFM Business	Text	Domestic Intermodal
FREQ	Service Frequency: Trains Per Annum	Float	1023
TRAFFICTONNES	Actual Annual Tonnes	Float	17042.4
CAPAC	Estimated Annual Capacity	Float	25563.6
CALIB	Calibration Factor	Float	0.58703

Software Required: Text editor or Spreadsheet.

Description of Use: Contains assigned rail traffics for *domestic* rail services. Services into or out of ports are listed with port codes next to the origin or destination. They are grouped according to rail business codes.

pdms_rd_fnw.mid/mif

File Format:

Field	Description	Data Format	Example
ROAD_LINK_ID	Road Link ID Number	Integer	19558
AREA TYPE	Area Type	Integer	9
GB_ZONE	GB Postcode Zone	Text	TR20
GB_COUNTY	GB County	Integer	33
GB_REGION	GB GO Region	Integer	7
ROAD_TYPE	Road Type	Integer	5
SPEED	Road Speed (Free Flow Car Kph)	Integer	30
SLM_CAT	Sensitive Lorry Miles Category	Integer	5
KMS	Link Length Kms	Float	0.8600
TONNES	Annual Tonnes Loaded onto Link	Float	6605
RIGIDS	Annual Rigid HGV Trips	Float	14.34
ARTICS	Annual Articulated HGV Trips	Float	547.54
HGVS	Annual HGV Trips	Float	561.9
TOLL	Toll Revenue	Float	0.0
FUEL_CONS	Annual Fuel Consumption, Litres	Float	184.69

Software Required: Text editor or GIS Software.

Description of Use: Pure domestic road traffic assigned to the network, measured in vehicle trips per annum (rigid and articulated), showing ten area types, six road types, toll revenue, litres of diesel consumed and external costs.

3. GBFM DEVELOPER'S REFERENCE

3.1 Overview

This section provides a reference for GBFM developers, by describing the system at a modular level. A full flow chart is shown in appendix 1 showing graphically how the higher-level components interact. The purpose of this guide is to provide more detailed information for anybody wishing to extend or debug the system at the source code level.

3.2 General Issues

GBFM is a C++ program, developed with Microsoft Visual Studio 2005 as a .Net 2.0 executable. It uses a combination of ISO or Standard C++ and C++/CLI (also known as Managed Extensions for C++, Visual C++ .Net and C++.Net). The most important components all use Standard C++. However managed C++ is mainly used for the interface to take advantage of the built-in .Net libraries. However, note that in Visual Studio 2005, the managed code syntax changed, and GBFM has been standardised to the new syntax.

It is generally clear whether managed or unmanaged code is being used, so this distinction should be adhrered to. Only very specific modules mix the two systems, and these are the interfaces where the higher level managed objects pass control over to the lower level unmanaged objects.

Backwards compatibility with older Microsoft C++ compilers is unlikely as they will not support the new syntax for the managed extensions, nor any .Net library functions that can only be found in .Net 2.0. So while the code can be edited using any IDE, it is advisable to obtain a copy of Visual Studio 2005 Professional Edition or higher to compile the system. It is then possible to load the entire GBFM500 solution (GBFM500.sln), with all the compilation and linker settings intact.

If you are unfamiliar with the .Net system, or the implementation of managed extensions for C++, read Stan Lippman's Hello C++/CLI article. This should at least convince you that the differences between Standard C++ and the managed extensions are more than superficial. At first the mixed-language approach may seem unnecessary, but as a way of integrating existing C++ code for the basic transport modelling capabilities and the existing .Net libraries for the interface, it has been successful.

3.3 Quick Reference

The bulk of the code is contained in just eight classes. These should be the starting point for understanding the GBFM methodology:

1. GBNetwork - the GB Road Network
2. GBRailNet - the GB Rail Network
3. BaseMatSeq - controls the construction of the trip matrices: generation and distribution. Accesses trade databases.
4. MatrixBuild - constructs the trip matrices, base year or forecast.
5. ForeCastSeq - controls the trip-chain modelling: multi-modal path choice. Merges results from IntlModule and PdmsModule to produce 'GB' results.
6. IntlModule - constructs the trip chains for international flows.
7. PdmsModule - constructs the trip chains for domestic flows.
8. Calibrate - compares estimated and actual flows in the base year to calibrate the model.

3.4 Reference

GBFM 5 consists of approximately 30 source files which fall into five categories:

1. The Matrix Generator (demand)
2. The Network and Costs (supply)
3. The Main Model (demand/supply interaction)
4. The Interface (for the user)
5. Miscellaneous

Each source file is described below, according to these categories. Standard (ISO) C++ modules are tagged (STD) and C++/CLI modules are tagged (CLI).

3.5 The Matrix Generator(demand)

3.5.1 BaseMatSeq (CLI)

BaseMatSeq is a controller for the processes related to traffic matrix construction, sequencing the various tasks, and providing a link to the Windows interface. It also contains the database routines for downloading and preparing the UK trade data. The key public methods are 'DoBaseMatSeq' and 'DoForcMatSeq' which set up instances of the 'MatrixBuild' class, and, respectively, produce base year and forecast year traffic matrices for the main GBFM model.

3.5.2 MatrixBuild (STD)

MatrixBuild is the centrepiece of this category with over 1,700 lines. It can construct all the network and supply side classes, and mixes the available flow data with the gravity model estimation techniques to output an international and a domestic freight matrix, with postcode zones. A large amount of the code in this module is simply I/O, with the most important steps contained in the 'WmFm()' and 'SplitCountyByPCD()' functions.

The 'RunScenario' section contains the top-level sequence for this module, with the international flows constructed first and the domestic flows second. Note that domestic GB rail flows (meaning non-port related) are added directly to the pure domestic road flows, whereas in the international set, the trade data is the basis for the total volume of traffic moving inland. As a result, the port related traffics do not necessarily go to the zones identifiable within the Network Rail data.

For the domestic matrix, flows are generated within the gravity model, and then grossed up to the levels found within CSRGT, with rail traffic added directly, so the CSRGT and Network Rail data set the absolute volumes, and the gravity model determines the sub-county shares. In the international matrix, the trade flows are broken down by county, according to the CSRGT, and then shared out amongst the post code zones using the land use data in a similar way as the domestic data. Here, the trade data sets the absolute volume, the CSRGT sets the share by UK county and the gravity model sets the shares by post code district within the county. So both sets make use of the CSRGT data in the base year, but rely upon the gravity model to estimate flows at a finer level of detail. Thus, changing the 'scenario' in the base year or the land-use data can alter the base matrix, but only at a sub-county level.

Once the 'RunScenario' sequence has produced the base year matrices, it saves the factors that constrain the domestic flows to the CSRGT data.

The 'RunForecastScenario' routine can be used to produce future of hypothetical trip matrices. On the domestic side, it uses the factors calculated in the base year as inputs, and alternative employment, land-use and cost data can be used to change the volume and distribution of freight traffic. On the international side, alternative costs, land use patterns and employment patterns can also be fed in to produce alternative trip matrices **but the total volume of trade does not change.** Trade forecasts are always exogenous in GBFM5, and fed into the program through the main model, via a file generated by the FORK system, picked up through the 'Scenario' spreadsheet (cell F9). An equivalent, exogenous traffic growth mechanism exists for the domestic sector in the main mode, relating changes in industrial output to domestic tonnes lifted. This allows additional, unmodelled factors, such as improvements in productivity, logistical changes or sectoral shifts to influence traffic growth in addition to the three modelled factors; employment, industrial floor-space and transport costs.

The 'RunForecastScenario' routine in 'MatrixBuild' only affects trips that use the gravity model. The exception here is rail. Irrespective of transport costs, employment and land-use, rail flows are added directly to the domestic traffic set without modification.

3.5.3 EconLinks (STD)

EconLinks provides access to the information in the 'iotable_survey.csv' file, which shows which industries are linked via the exchange of which products. The class is constructed with a pointer to the file path. The constructor reads in the file, and an access member is provided called 'GetValue'. The module will fail if SIC values outside the range 0-100 are used.

3.5.4 Gravity (STD)

Gravity is also a simple wrapper class for a single input file 'gravityresults02.csv'. The constructor causes the file to be read, and an access method is provided called 'GetRecord', returning a 'GravRec' structure, also defined inside the class.

3.5.5 LandUse (STD)

LandUse acts as a wrapper for the files containing data for employment by zone and land-use (square metres of industrial floorspace). It needs a pointer to the road network in the constructor, but this is only because some access methods require translations from postcodes to counties. The employment data is accessed through the 'GetPcdSic' methods. The floorspace data is accessed through 'Get_PCD_MSQ_Wgt'. The 'LoadPCDProbs' functions create a vector of zones with their gravity values.

3.5.6 Unitised (STD)

Unitised provides a simple conversion from tonnes into unitised tonnes, for a given commodity. It is used to assign the basic mode for intra-European trade data. The main access method is 'GetUnitisedShare()'.

3.6 The Network and Costs

3.6.1 Cost Model (STD)

The CostModel source code contains two classes; RoadCost and RailCost. They are constructed using the input data from the 'Scenario', and perform simple road and rail cost calculations. It is not always necessary to use these classes to calculate costs, but it is generally advisable in order to ensure consistency throughput the program. Simple link-based generalised costs can be calculated here, and external costs based on SLM rates for the given road and area types. Road costs are always link-based (i.e. excluding any access/egress costs), but rail costs can either be calculated for a link or for a full terminal to terminal trip, including terminal costs, but excluding any onward road costs.

3.6.2 Node (STD)

Node is the foundation for all the network or GIS-related routines. It represents a point in the network, with various labels allowing to be marked as 'visited', or to store the name of the postcode zone it is found inside.

Link (STD)

There is a hierarchy of links, with increasing complexity. There is a base class called 'Link', a link-with-attributes class called 'ALink' and a class that can store traffic data, broken down by vehicle categories called 'TALink'.

3.6.3 Region (STD)

Two classes are provided; a simple base class for handling polygons e.g. county boundaries, and a derived class with GBFM-specific attributes.

3.6.4 Town (STD)

Towns are simply geo-referenced points, corresponding to the main GB towns and freight facilities such as ports. They provide a compromise between the 'Region' and the 'Node' classes.

3.6.5 Dijkstra (STD)

The Dijkstra class handles all the short-path optimisations. It is constructed with references to a link and node network, based upon the GBFM link and node classes. The overall speed of GBFM depends to a large extent upon the efficiency of this class, particularly when the network sizes are quite large. The class can either be used to collect summary information about a path (e.g. its distance) or it can return the stack of links that constitute the path.

3.6.6 GBNetwork (STD)

GBNetwork contains all the functions related to the GB road network. It reads in and translates the network GIS data, provides methods for calculating distances and costs within the network, and it allows traffic to be assigned and saved.

3.6.7 GBRailNet (STD)

GBRailNet is similar to GBNetwork, as it provides a high-level interface to the GB rail network. However, it also allows rail services (terminal to terminal links) to be constructed, and provides methods for choosing suitable rail services for any given freight trip. Assignment to services is possible, but not assignment to links in the railway network.

3.6.8 GBSeaNetwork (STD)

GBSeaNetwork is a service-based network for maritime services, offering port-to-port links for short sea unitised flows, and open ended services from GB ports for short sea conventional traffics.

3.6.9 EUNetwork (STD)

EUNetwork contains a set of road and rail distances and costs connecting Continental ports to Continental regions. It is used to return road and rail costs so that the overseas routing can be calculated. Thus, changes in overseas road costs could potentially alter GB port choice, and therefore affect GB inland traffic flows. EUnetwork does not use a detailed link and node network, it reads zone to zone distances from a database.

3.7 The Main Path Choice Model

3.7.1 ForeCastSeq (CLI)

ForeCastSeq is a managed class that acts as a wrapper for the main underlying model processes, controlling the flow of the main model. When the user activates the red 'Run GBFM' button on the main dialog, control is passed over to this class. It constructs and runs the two core modelling classes, 'IntlModule' and 'PdmsModule', and it provides all the database routines to merge the two sets of outputs into a harmonised set of GB outputs.

3.7.2 IntlModule (STD)

IntlModule is the International Module. It reads in the international trip matrix, applies any forecasts required if the output year is in the future, and constructs the trip chains. It starts by constructing various Network/GIS objects, and then processes the trip data, calculating multi-modal paths for each one. Generalised costs are calculated for each path, and traffic is assigned using F-Logit. Each section of the multi-modal path is then assigned back to its own mode-specific network, and each network stores and outputs a link-based analysis.

3.7.3 PdmsModule (STD)

Pdms Module is the domestic module handling everything except international flows. It reads the domestic trip matrix, applies a simple trend forecast if the output year is in the future, and constructs road, rail, and road+rail paths. Like the international module, it starts by constructing various Network/GIS objects, and then processes the trip data, calculating road and rail paths for each one. For road, separate paths are calculated for each vehicle category. Generalised costs are calculated for each path, and traffic is assigned using F-Logit. The road and rail sections of the paths are then assigned back to the GB road and rail networks, and each stores and outputs a link-based analysis.

3.7.4 Calibrate (CLI)

Calibrate provides high level routines for running the 'ForeCastSeq' sequence multiple times, and modifying the calibration values in an attempt to improve the model's accuracy. Four sets of results are calibrated: unitised international links, conventional international links, inland rail links, and inland road shares by vehicle category, and these are handled simultaneously. The routine uses managed extensions, and it controlled inside the 'CalibForm' interface class at the same level as 'ForeCastSeq'. It is called at the end of a 'ForeCastSeq' process, and the 'CalibForm' class controls how many times it is executed.

3.7.5 Flogit (STD)

Flogit is the module containing the implementation of the F-Logit algorithm, used throughout GBFM to convert path costs into expected shares. The algorithm has been updated for GBFM5, using STL and adding separate access methods for international and domestic trips, but the underlying methodology remains as before.

3.7.6 MacroForecast (STD)

MacroForecast provides an interface to the data in the 'forecast/dom_grow_?' files. It reads in historical (from 1980) and forecast rates of growth in manufacturing output, extrapolates the last provided growth rate to a preset horizon year (currently set at 2050), and calculates change factors to convert base year tonnages into forecast year quantities. This only applies to the PDMS (pure domestic) module.

3.7.7 TradeForecast (STD)

TradeForecast provides an interface to the trade forecast data in the 'trd_grow_?' files. It reads in a single growth rate for each trade flow, and the module provides access methods to simulate either linear (the default) or compound growth rates. This only applies to the INTL (international) module.

3.8 The User Interface

3.8.1 Form1 (CLI)

Form1 is the main user interface that the program loads on start-up. It has menu-bar access to the other parts of the interface, and a set of controls for launching a sequence of GBFM scenarios.

3.8.2 BaseMatForm (CLI)

BaseMatForm is the form containing options for constructing the model's base year matrix.

3.8.3 CalibForm (CLI)

CalibForm is the form containing options for calibrating the model. The 'RunCalib' method controls the number of times the model is run and the step size between iterations. If more complex iterations are required, they can be set up here, rather than in the 'Calibrate' class.

3.8.4 ForcMatForm (CLI)

ForcMatForm is the form with controls for forecasting the trip matrix. It simply collects inputs from the user and passes them to 'BaseMatSeq' via the 'DoForcMatSeq' function.

3.8.5 SettingsForm (CLI)

SettingsForm allows the user to modify the installation settings by nominating a path to the GBFM input files and a name for the file containing the model parameters. The settings are saved in a file called Gbfm500.ini. It is therefore possible for a single installation to work with several sets of inputs (e.g. different users' settings, or different base years) and/or several sets of model parameters.

3.8.6 ModelParameters (STD)

ModelParameters is a simple interface for the data contained in the 'inputs/para_base_??' file. Classes that use the model parameters can access the settings through public member variables.

3.8.7 XlScenario (STD)

XlScenario is an interface (via ADO: Microsoft ActiveX Data Objects), allowing GBFM to read the scenario settings directly from an Excel file. It does not depend upon any given version of Excel, but it is Windows specific. The class also generates log files, so that the scenario settings can be saved with the outputs.

3.9 Miscellaneous

3.9.1 Gbfm_Fds.h (STD)

This is a header file containing most of the commonly used data structures and definitions. Many of the output files stick to the definitions found here. It covers: International/Domestic codes, Sea Modes, Land Modes, Road Types, and Area Types

3.9.2 Gbfm_Utils.h/cpp (STD)

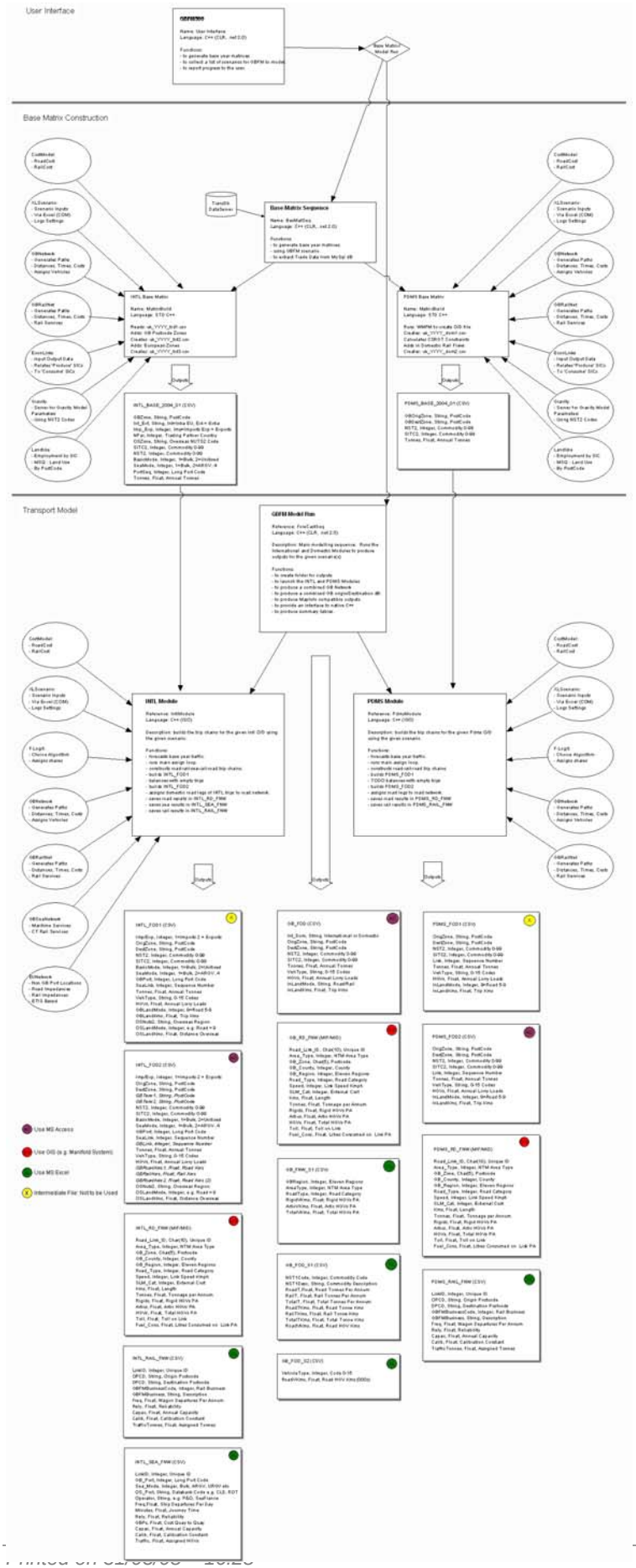
GbFm_Utils is a collection of useful low-level functions required throughout the program. It contains a time and date function, upper and lower case conversions, and functions for converting comma, quote, and other character separated lists. These are more suitable for STD classes than .Net ones, but similar library functions can usually be found in the .Net libraries.

3.9.3 GBFM500.cpp (STD)

This code snippet contains the entry point for the application, causing 'Form1' to be activated.

APPENDIX 1: GBFM FLOW CHART

The following page shows a flow chart representing the different stages and inputs and outputs of GBFM. It is rather too small to be viewed on A4 so is best viewed printed separately on a larger paper size, or zoomed in on a computer screen.


User Interface
Base Matrix Construction
Transport Model
Use MS Access
Use GIS (e.g. Manifold System)
Use MS Excel
Intermediate File: Not to be Used

APPENDIX 2. LOOKUP CODES

GB Government Office Regions

1	North East
2	Yorkshire and Humberside
3	East Midlands
4	East of England
5	South East
6	London
7	South West
8	West Midlands
9	North West
10	Wales
11	Scotland

Road Types

1	Motorway
2	Trunk Dual
3	Principal Dual
4	Trunk Single
5	Principal Single
6	Minor

Area Types

1	Central London
2	Inner London
3	Outer London
4	Inner Conurbations
5	Outer Conurbations
6	Urban Big
7	Urban Large
8	Urban Medium
9	Urban Small
10	Rural

HGV Categories

Category	Description
1	Rigid. 2 axle
4	Rigid. 3 axle
5	Rigid. 4 axle
8	Artic. 3/4/5 axle
15	Artic. 6 axle

Basic Sea Mode

1	Bulk
2	Unitised
3	Non-Sea

Detailed Sea Mode

1	Bulk
2	Accompanied HGV
3	Unaccompanied trailer
4	Lolo
5	Rail

Overseas Land Mode

5	Rail container
6	Rail Unaccompanied Trailer (Piggyback)
7	Rail Accompanied Trailer (RoLa)
8	Rail Conventional Wagon
9	Road Accompanied Trailer

GB Counties

1	Cleveland
2	Durham
3	Cumbria
4	Northumberland
5	Tyne And Wear
6	Humberside
7	North Yorkshire
8	South Yorkshire
9	West Yorkshire
10	Derbyshire
11	Nottinghamshire
12	Leicestershire
13	Northamptonshire
14	Lincolnshire
15	Cambridgeshire
16	Norfolk
17	Suffolk
18	Bedfordshire
19	Hertfordshire
20	Berkshire
21	Buckinghamshire
22	Oxfordshire
23	East Sussex
24	Surrey
25	West Sussex
26	Essex
27	Greater London
28	Hampshire
29	Kent
30	Avon
31	Gloucestershire
32	Wiltshire
33	Cornwall
34	Devon
35	Dorset
36	Somerset
37	Hereford And Worcester
38	Warwickshire
39	Shropshire
40	Staffordshire
41	West Midlands
42	Cheshire
43	Greater Manchester
44	Lancashire

45	Merseyside
46	Clwyd
47	Dyfed
48	Gwynedd
49	Powys
50	Gwent
51	Mid Glamorgan
52	South Glamorgan
53	West Glamorgan
54	Borders
55	Central
56	Fife
57	Lothian
58	Tayside
59	Dumfries And Galloway
60	Strathclyde
61	Highland
62	Grampian

GB Ports

GB Port code	Port Seq	Port Name	Port Alpha code
2701	1	LONDON	LON
2601	2	COLCHESTER	COL
2901	3	THAMESPORT	THP
2902	4	MEDWAY	MED
2903	5	WHITSTABLE	WTS
2904	6	RAMSGATE	RMG
2905	7	DOVER	DOV
2906	8	FOLKESTONE	FOL
2301	26	NEWHAVEN	NHV
2302	27	SHOREHAM	SHO
2801	28	PORTSMOUTH	PTM
2802	29	SOUTHAMPTON	STN
2803	30	COWES	COW
3501	51	POOLE	POO
3502	52	WEYMOUTH	WEY
3401	53	EXETER	EXE
3402	54	TEIGNMOUTH	TNM
3403	55	PLYMOUTH	PLY
3301	56	FOWEY	FOY
3302	57	PAR	PAR
3303	58	FALMOUTH	FAL
3304	59	PENZANCE	PEN
3601	76	WATCHET	WAT
3001	77	AVONMOUTH	AVO
3101	78	SHARPNESS	SSS
5001	79	NEWPORT	NPT
5201	80	CARDIFF	CDF
5301	81	PORT TALBOT	PTB
5302	82	SWANSEA	SWA
4701	101	MILFORD	MIL
4702	102	FISHGUARD	FIS
4703	103	LLANDULAS	LLA
4801	104	HOLYHEAD	HLD
4601	105	MOSTYN	MOS
4201	126	ELLESMERE PORT	ELL
4203	128	RUNCORN	RUN
4301	129	MANCHESTER	MNC
4501	131	LIVERPOOL	LIV

4401	132	FLEETWOOD	FLE
4402	133	HEYSHAM	HEY
301	134	BARROW IN FURNESS	BAR
302	135	WHITEHAVEN	WHV
303	136	WORKINGTON	WOR
304	137	SILLOTH	SIL
6001	151	AYR	AYR
6002	152	IRVINE	IRV
6003	153	ARDROSSAN	ARD
6004	154	GREENOCK	GRK
6005	155	GLASGOW	GLW
6101	157	STORNOWAY	STO
6102	159	KIRKWALL	KWL
6103	160	LERWICK	LER
6104	161	INVERNESS	INV
6201	162	FRASERBURGH	FRB
6202	163	PETERHEAD	PHD
6203	164	ABERDEEN	ABD
5801	165	MONTROSE	MON
5802	166	DUNDEE	DUN
5601	167	METHIL	MTH
5602	168	KIRKCALDY	KKD
5701	169	GRANGEMOUTH	GRG
5702	170	LEITH	LEI
5701	171	ROSYTH	ROS
5701	172	HOUND POINT	HPT
401	176	BLYTH	BLY
501	177	TYNE	TYN
502	178	SUNDERLAND	SUN
101	179	HARTLEPOOL	HTP
102	180	MIDDLESBROUGH	MID
701	182	WHITBY	WTB
702	183	SCARBOROUGH	SCA
601	201	HULL	HUL
602	202	GOOLE	GOO
603	203	TRENT	TRT
604	204	IMMINGHAM	IMM
605	205	GRIMSBY	GRI
1401	226	BOSTON	BOS
1501	227	WISBECH	WIS
1601	228	KINGS LYNN	KLN

1602	229	GREAT YARMOUTH	GTY
1701	230	LOWESTOFT	LOW
1702	251	FELIXSTOWE	FXT
1703	252	IPSWICH	IPS
2604	253	HARWICH	HRH
6301	301	BELFAST	BEL
6601	302	COLERAINE	CLR
6602	303	LONDONDERRY	LDY
6501	304	WARRENPOINT	WPT
4403	326	DOUGLAS	DGS
2804	327	GUERNSEY	GSY
2805	328	JERSEY	JSY
2907	424	CHAN TUNNEL	CFL
6401	425	IRISH LAND BDY	ILB
2201	426	BRIZE NORTON	BZN
6302	427	BELFAST APT	BFS
2702	428	HEATHROW APT	LHR
2501	429	GATWICK APT	LGW
4302	430	MANCHESTER APT	MAN
6006	431	PRESTWICK APT	PIK
2602	432	SOUTHEND APT	SEN
4101	433	BIRMINGHAM APT	BHX
2603	434	STANSTED APT	LSA
4404	435	RONALDSWAY APT	RWY
1801	436	LUTON APT	LTN
1201	437	EAST MIDLANDS APT	EMA
3002	438	BRISTOL AIRPORT	BRS
5202	439	CARDIFF AIRPORT	CWL
3404	440	EXETER AIRPORT	EXT
3503	441	BOURNEMOUTH AIRP	BOH
2806	442	SOUTHAMPTON AIRP	SOU
1603	443	NORWICH AIRPORT	NWI
4502	444	LIVERPOOL AIRP	LPL
901	445	LEEDS/BRAD AIRP	LBA
503	446	NEWCASTLE AIRP	NCL
103	447	TEESIDE AIRPORT	MME
5703	448	EDINBURGH AIRP	EDI
6204	449	ABERDEEN AIRP	ABZ
6007	450	GLASGOW APT	GLA

Overseas Country code

Overseas Country code	Country OD Alpha	Country Name
1010	FR	FRANCE
1020	BE	BELGIUM/LUX
1021	BE	BELGIUM
1022	LU	LUXEMBOURG
1030	NL	NETHERLANDS
1040	DE	GERMANY
1050	IT	ITALY
1060	GB	UK
1070	IE	IRISH REPUBLIC
1080	DK	DENMARK
1090	GR	GREECE
1100	PT	PORTUGAL
1110	ES	SPAIN
1210	IC	CANARY IS
1220	XI	CEUTA & MELILLA
1221	CT	CEUTA
1222	MI	MELILLA
1240	IS	ICELAND
1270	SJ	SVALBARD ARCH
1280	NO	NORWAY
1300	SE	SWEDEN
1320	FI	FINLAND
1360	CH	SWITZERLAND
1370	LI	LIECHTENSTEIN
1380	AT	AUSTRIA
1410	FO	FAROE ISLANDS
1430	AD	ANDORRA
1440	GI	GIBRALTAR
1450	VA	VATICAN CITY
1460	MT	MALTA
1470	SM	SAN MARINO
1480	YU	YUGOSLAVIA
1482	SI	SLOVENIA
1483	HR	CROATIA
1484	BA	BOSNIA & HERZEGOVINA
1485	SX	SERBIA & MONTENEGRO
1486	MK	FYR MACEDONIA

1487	XM	MONTENEGRO
1488	XK	KOSOVO
1489	XS	SERBIA
1500	SU	USSR
1501	EE	ESTONIA
1502	LV	LATVIA
1503	LT	LITHUANIA
1504	SU	CIS
1505	UA	UKRAINE
1506	BY	BELARUS
1507	MD	MOLDOVA
1508	RU	RUSSIA
1509	GE	GEORGIA
1510	AM	ARMENIA
1511	AZ	AZERBAIJAN
1512	KZ	KAZAKHSTAN
1513	TM	TURKMENISTAN
1514	UZ	UZBEKISTAN
1515	TJ	TAJIKISTAN
1516	KG	KYRKYZ REP.
1520	TR	TURKEY
1580	DD	GERMAN DEM REP
1600	PL	POLAND
1610	CS	CZECHOSLOVAKIA
1611	CZ	CZECH REPUBLIC
1612	SK	SLOVAKIA
1640	HU	HUNGARY
1660	RO	ROMANIA
1680	BG	BULGARIA
1700	AL	ALBANIA
2000	MA	MOROCCO
2010	DZ	ALGERIA
2020	TN	TUNISIA
2030	LY	LIBYA
2040	EG	EGYPT
2050	SD	SUDAN
2060	MR	MAURITANIA
2070	ML	MALI
2080	BK	BURKINA
2090	NE	NIGER
2100	TD	CHAD

2110	CV	CAPE VERDE
2120	SN	SENEGAL
2130	GM	GAMBIA
2140	GW	GUINEA-BISSAU
2150	GN	GUINEA
2160	SL	SIERRA-LEONE
2170	LR	LIBERIA
2180	CI	IVORY COAST
2190	GH	GHANA
2200	TG	TOGO
2210	BJ	BENIN
2220	NG	NIGERIA
2230	CM	CAMEROON
2240	CF	CENT AFR REPUBLIC
2260	GQ	EQUATORIAL GUINEA
2270	ST	SAO TOME & PRINCIPE
2280	GA	GABON
2290	CG	CONGO (REPUBLIC)
2300	ZR/	CONGO (DEM. REP)
2310	RW	RWANDA
2320	BI	BURUNDI
2330	SH	ST HELENA
2340	AO	ANGOLA
2350	ET	ETHIOPIA
2351	ER	ERITREA
2360	DJ	DJIBOUTI
2370	SO	SOMALIA
2380	KE	KENYA
2390	UG	UGANDA
2400	TZ	TANZANIA
2410	SC	SEYCHELLES
2420	IO	BR IND OC TERR
2430	MZ	MOZAMBIQUE
2440	MG	MADAGASCAR
2450	RE	REUNION
2460	MU	MAURITIUS
2470	KM	COMOROS
2480	ME	MAYOTTE
2490	ZM	ZAMBIA
2500	ZW	ZIMBABWE
2510	MW	MALAWI

2520	ZS	SOUTH AFRICA/NAMIBIA
2521	ZA	SOUTH AFRICA
2522	NA	NAMIBIA
2530	BW	BOTSWANA
2540	SZ	SWAZILAND
2550	LS	LESOTHO
3000	US	USA
3001	PR	PUERTO RICO
3010	CA	CANADA
3020	GL	GREENLAND
3030	PM	ST PIERRE & MIQ
3040	MX	MEXICO
3050	BM	BERMUDA
3060	GT	GUATEMALA
3070	BZ	BELIZE
3080	HN	HONDURAS
3090	SV	EL SALVADOR
3100	NI	NICARAGUA
3110	CR	COSTA RICA
3120	PA	PANAMA
3130	AI	ANGUILLA
3140	CU	CUBA
3150	KN	ST KITTS & NEVIS
3160	HT	HAITI
3170	BS	BAHAMAS
3180	TC	TURKS & CAICOS
3190	DO	DOMINICAN REP
3200	VI	US VIRGIN IS
3210	GP	GUADELOUPE
3220	AG	ANTIGUA & BARBUDA
3230	DM	DOMINICA
3240	MQ	MARTINIQUE
3250	KY	CAYMAN IS
3260	JM	JAMAICA
3270	LC	ST LUCIA
3280	VC	ST VINCENT
3290	VG	BR VIRGIN IS
3300	BB	BARBADOS
3310	MS	MONTSERRAT
3320	TT	TRINIDAD & TOBAGO
3330	GD	GRENADA

3340	AA	ARUBA
3350	AN	CURACAO
3360	CO	COLOMBIA
3370	VE	VENEZUELA
3380	GY	GUYANA
3390	SR	SURINAM
3400	GF	FRENCH GUIANA
3410	EC	ECUADOR
3420	PE	PERU
3430	BR	BRAZIL
3440	CL	CHILE
3450	BO	BOLIVIA
3460	PY	PARAGUAY
3470	UY	URUGUAY
3480	AR	ARGENTINA
3490	FK	FALKLAND IS
4000	CY	CYPRUS
4010	LB	LEBANON
4020	SY	SYRIA
4030	IQ	IRAQ
4040	IR	IRAN
4050	IL	ISRAEL
4051	GJ	OCCUPIED PALESTINE TERRITORY
4060	JO	JORDAN
4070	SA	SAUDI ARABIA
4080	KW	KUWAIT
4090	BH	BAHRAIN
4100	QA	QATAR
4110	DH	ABU DHABI
4111	DU	DUBAI
4112	HA	SHARJAH
4120	OM	OMAN
4140	YE	YEMEN
4141	YD	S YEMEN
4142	YE	N YEMEN
4150	AF	AFGHANISTAN
4160	PK	PAKISTAN
4170	IN	INDIA
4180	BD	BANGLADESH
4190	MV	MALDIVES
4200	LK	SRI LANKA

4210	NP	NEPAL
4220	BT	BHUTAN
4230	BU	BURMA
4240	TH	THAILAND
4250	LA	LAOS
4260	VN	VIETNAM
4270	KH	CAMBODIA
4280	ID	INDONESIA
4281	TP	EAST TIMOR-1
4290	MY	MALAYSIA
4300	BN	BRUNEI
4310	SG	SINGAPORE
4320	PH	PHILIPPINES
4330	MN	MONGOLIA
4340	CN	CHINA
4350	KP	NORTH KOREA
4360	KR	SOUTH KOREA
4370	JP	JAPAN
4380	TW	TAIWAN
4390	HK	HONG KONG
4400	MO	MACAO
5000	AU	AUSTRALIA
5010	PG	PAPUA NEW GUINEA
5020	ZE	AUSTRAL OCEANIA
5030	NR	NAURU
5040	NZ	NEW ZEALAND
5050	SB	SOLOMON IS
5060	TV	TUVALU
5070	NC	NEW CALEDONIA
5080	PU	US OCEANIA
5090	WF	WALLIS & FUTUNA
5100	KI	KIRIBATI
5110	PN	PITCAIRN
5120	NU	NIUE & TOKELAU IS
5121	CK	COOK IS
5130	FJ	FIJI
5140	VU	VANUATU
5150	TO	TONGA
5160	WS	SAMOA
5170	MP	NORTH MARIANA IS
5180	PF	FRENCH POLYNESIA

5190	FM	MICRONESIA
5200	MH	MARSHALL IS
5210	PW	PALAU
5220	AS	AMERICAN SAMOA
5230	GU	GUAM
5240	UM	US MINOR ISLANDS
5250	CC	COCOS ISLANDS
5260	CX	CHRISTMAS ISLANDS
5270	HM	HEARD AND MACDONALD ISLANDS
5280	NF	NORFOLK ISLAND
5290	TK	TOKELAU ISLANDS
5300	AC	POLAR REGIONS
5310	AQ	ANTARCTICA
5320	BV	BOUVET
5330	GZ	S GEORGIA AND STHN SANDWICH
5340	TF	FR STHN TERRITORIES